Assessing Canadian Municipal Climate Change Adaptation Plans: Investigating Equity Considerations in Adaptation Planning

Vasantha Susarla

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By: Vasantha Susarla

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Signed by the final examining committee:

_____ Chair
Dr. Damon Matthews

_____Thesis Supervisor
Dr. Alexandra Lesnikowski

_____ Examiner
Dr. David Wachsmuth

_____ External Examiner
Dr. James Connolly

Approved by:

_____ Dr. Pascale Biron,
Graduate Program Director

_____ Dr. Pascale Sicotte,
Dean of Faculty of Arts and Science

_____ 2024

Abstract for Masters

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Vasantha Susarla

This research delves into the integration of equity considerations in local climate adaptation plans across Canadian municipalities within the multi-level governance structure. Despite the prevalent framing of adaptation as a local issue, this study examines whether Canadian municipalities genuinely consider equity in their adaptation planning process. By employing a critical equity lens, the impact of population size, regional affiliation, and consulting group involvement on adaptation plan quality and equity considerations is scrutinized. My research questions are as follows:

1) Do Canadian municipalities consider equity in relation to adaptation planning?
2) Are vulnerable and marginalized groups included in the adaptation planning process?
3) Are local adaptation plans likely to reduce vulnerability for marginalized groups?

The findings reveal that neither population size nor regional affiliation significantly influences the adoption of an equity lens in adaptation plans. Moreover, there is limited insight into vulnerability reduction for marginalized communities, and the participation of these communities in the planning process is weak across all municipalities. The acknowledgement of equity within the documents often serves a symbolic purpose, primarily found in the fact-setting agenda. The lack of implementation details in many plans and a deficiency in monitoring and evaluation data hinders the assessment of the plans effectiveness in reducing vulnerability for these groups. This study emphasizes the need to move beyond symbolic gestures, urging governments to actively prioritize equity considerations in adaptation planning for the resilience and wellbeing of all community members to address the complex challenges of climate change.

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Chapter 1: Introduction

1.1 Climate Change Adaptation: Global Context

In the face of escalating climate change impacts, the current state of global climate change adaptation reflects a complex landscape shaped by the dynamic interplay of scientific advancements, policy initiatives, and frontline actions. As communities grapple with increasing frequency and intensity of extreme weather events, rising sea levels, and disruptions to ecosystems, adaptation efforts are imperative to address climate vulnerability and structural inequalities. The discourse surrounding climate change adaptation has evolved into a multidimensional framework, encompassing physical infrastructure development, socio-economic considerations, equity, and governance structures. The IPCC, a globally recognized body providing policy-relevant information to decision-makers by synthesizing the current state of knowledge on climate change, defines adaptation as a “response to current climate change, reducing climate risks and vulnerability mostly via adjustment of existing systems” (IPCC, 2022 p. 20). Adaptation involves a spectrum of strategies and measures to minimize the adverse effects of climate change. The 2022 IPCC Sixth Assessment Report highlights the urgent need to adapt to key climate change risks and embark on “Climate Resilient Pathways” in order to facilitate sustainable development (IPCC, 2022). Climate resilient pathways are developmental pathways that prioritize harmonious and inclusive decision making for the health, safety, and longevity of our planet (IPCC, 2022).

The commitment to reduce warming necessitates adaptation on some level due to existing and inevitable impacts of climate change. Understanding that the climate is already changing, adaptation planning and literature focuses on adapting to the unavoidable impacts of climate change caused by historical emissions and systemic social oppression. There must be greater effort to bridge the understanding of the drivers of social vulnerability an unequal socio-spatial impacts within adaptation planning theory. According to the Climate Action Tracker, current global policies are projected to increase the temperature by 2.7℃ above pre-industrial levels by 2100 (Climate Action Tracker, 2022), yet the IPCC Sixth Assessment Report showcases how even 1.5℃ of warming above pre-industrial levels will have catastrophic and irreversible effects on habitats such as coral reefs, Arctic Sea ice, rainforests, and urban and rural settlements. Globally, it is evident that we are failing to meet emission reduction targets to prevent warming above 1.5℃ and we are simultaneously delaying adapting for extreme warming scenarios. Similarly, the 2022 Emissions Gap Report reinforces how “the world is still falling short of the Paris climate goals, with no credible pathway to 1.5℃ in place” and “In light of the magnitude of the emissions gap, wide ranging, large-scale, rapid and systemic transformation is now necessary to achieve the temperature goal of the Paris Agreement" (UNEP, 2022). The difference between 1.5℃ and 2.8℃ warming is catastrophic. It is evident that governing bodies must be prepared to handle increasingly complex climate related planetary crises (UNEP, 2022).

The Adaptation Gap Report 2022 underscores the potential co-benefits arising from concurrent adaptation and mitigation actions, emphasizing that mitigating the current and anticipated severity of climate change opens up more opportunities for effective adaptation to its unavoidable impacts (UNEP, 2022; IPCC, 2022). Within this context, the report identifies key adaptation gaps, including issues related to funding, implementation, and equity (UNEP, 2022). There are global deficiencies in

adapting to escalating climate risks, particularly regarding the insufficient international financial support to translate adaptation plans into actionable measures, notably in developing countries (UNEP, 2022). The widening financial disparity poses a significant challenge to effective adaptation, especially for vulnerable and marginalized communities. Amid accelerating climate risks, adaptation is largely incremental. Without substantial and urgent support, adaptation actions may lag behind climate risks, exacerbating the implementation gap.

The Adaptation Gap Report 2022 articulates that "for adaptation to be just, equitable, effective and sustainable, it also needs to be 'owned' by those it is intended to benefit. This requires the genuine co-production of adaptation actions by coalitions of stakeholders that blend scientific expertise with local, traditional and indigenous knowledge and perspectives" (UNEP, 2022, p.45). This includes prioritizing the needs of vulnerable peoples and habitats; creating equitable financing opportunities at every scale; and integrating scientific, Indigenous, and local knowledge to address climate discussions. In neglecting these fundamental principles, the planet is heading towards increased warming, vulnerability, poverty, injustice, and ecosystem degradation (Portner & Roberts, 2022 p. 30). Nonetheless, there is increasing evidence that adaptation strategies that do not integrate equity considerations may worsen inequalities and increase injustice (Araos et al., 2021).

1.2 Climate Change Impacts in Canada

The "Canada in a Changing Climate Report" of 2019, released by Natural Resources Canada, provides an in-depth analysis of the multifaceted impacts of climate change across the country, offering a nuanced understanding of climatic indicators (temperature, precipitation, extreme events etc.) and regional disparities. As a foundational resource, the report spotlights the undeniable reality that Canada is undergoing significant warming, almost double the global average (Bush & Lemmen, 2019). This warming trend is linked to numerous consequences, from increasing frequency and severity of extreme weather events to changing precipitation patterns (Bush & Lemmen, 2019). Changing precipitation patterns impact regions differently, with some areas facing flood risk while others anticipate drought (Bush & Lemmen, 2019). Heatwaves are becoming more intense and lasting longer as well, contributing to public health and agricultural risks (Bush & Lemmen, 2019). Along Canada's coast, rising sea levels in conjunction with storm surges and extreme weather events pose risks to coastal communities and habitats (Bush & Lemmen, 2019). Arctic Canada is also undergoing significant changes, with thawing permafrost, melting sea ice, and shifting ecosystems (Bush & Lemmen, 2019).

The three subsequent reports by National Resources Canada highlight climate change impacts through national, regional, and public health perspectives. Notably, these reports emphasize how socioeconomic vulnerabilities amplify the impacts of climate change. Canadian cities are responding to a multitude of climate change impacts. The 2021 "Canada in a Changing Climate: National Issues Report" established that the main impacts Canadian cities are grappling with are: growing urbanization, aging infrastructure, environmental pollution, and extreme heat and flooding events. In terms of equity, there is explicit acknowledgement regarding the unequal distribution of climate impacts; for example, the report highlights how the physical and mental health of Canadians is at risk. This is seen through the rising discourse around climate anxiety and despair (Warren & Lulham, 2021). Social equity in Canada is continuing to be challenged by climate change impacts such as

the loss of cultural and recreational activities and the loss of social capital and infrastructure. Pre-existing conditions such as age, chronic illness, and housing status increase the risk of being negatively affected by climate change (Brown et al., 2021). For example, the smoke from wildfires in British Columbia and western United States in 2018 resulted in poor air quality measurements, warning residents to abstain from strenuous physical activities outdoors (Wang & Strong, 2019). Poor air quality often affects children, seniors, and people with chronic respiratory and cardiac illnesses. Given that more extreme events are predicted in frequency and ferocity as climate change intensifies, these populations will be more at risk (Pidcock & McSweeney, 2022). Increasing representation of vulnerable groups, increasing adaptive capacity and social resilience, and place-based adaptation are key in order to address these issues (Warren & Lulham, 2021). Assessing the participation of civil society groups within adaptation planning is a key indicator of community participation and consent. Adaptive capacity, social resilience, and place-based adaptation will be discussed further in the following sections.

Rural communities in Canada are facing unique challenges due to climate change. Remote and rural communities in Canada are often geographically isolated and reliant on natural resources for wellbeing, livelihoods, and culture (Warren & Lulham, 2021). Furthermore, rural communities are experiencing changing demographics, such as aging populations, population growth in Indigenous communities, and outmigration. Changing demographics are shifting municipal capacity due to a shrinking labor force and tax base and eroding community cohesion (Warren & Lulham, 2021, p.110).

It is important to note that the differential impacts of climate change in vulnerable communities are rising as we approach high emission scenarios. For instance, Chapter 6 of the “Regional Perspectives Report” outlines how Northern regions of Canada are warming at three times the global mean temperature warming rate, resulting in cascading consequences for permafrost melt, subsequent flooding and habitat loss, precipitation patterns, and more (Hancock et al., 2022). Disturbances in these ecological systems directly and indirectly impact Northern communities because dramatic environmental and weather changes are linked to self-identity, cultural heritage, food security, mobility, and all aspects of living (Hancock et al., 2022). Understanding the impacts of climate change in Canada is critical to understand how biophysical and socioeconomic determinants of vulnerability are considered within climate change adaptation planning.

1.3 Climate Adaptation Planning in Canada

In a multi-level governance system such as Canada’s, climate policy issues are discussed at every level of government. Generally, adaptation has been framed as a local issue and devolved to the local level, with policies, mandates, and regulatory actions being prescribed by the provincial government (Nalau et al., 2015). Subsidiarity, as described by Marshall (2008), is the idea that a task should be decentralized to the smallest level of government that has the capacity to complete it. In terms of adaptation, subsidiarity positions local governments as “the key actor for adaptation planning and implementation and therefore the actor with the greatest responsibility” (Nalau et al., 2015 p. 90). Local governments face significant obstacles to adaptation, however, including lack of funding and financial resources to support climate planning and lack of specialized expertise to understand climate hazards and data (Reckien et al., 2015). This “adaptation is local” framing is starting to change as the National Adaptation Strategy (NAS) has

created a federal platform to address equity, amongst a multitude of other themes explored shortly, within climate adaptation, especially regarding “structural inequity, poverty, isolation, or discrimination” (Government of Canada, 2022).

At the federal level, the Pan-Canadian Framework (PCF) on Clean Growth and Climate Change (2016) was Canada’s inaugural national climate plan and emphasized collaboration among federal, provincial, and territorial governments. The plan is centered around “clean economic growth” and included a pan-Canadian approach to pricing carbon pollution. Marc Lee, a senior economist with the Canadian Center for Policy Alternatives, critiques the plan noting that it lacks clear goals, binding targets and timelines, does not include an action plan, nor does it have a formal prioritization of risks, rendering its effectiveness uncertain (Lee, 2016). Furthermore, the PCF is absent of concrete measures to address the social and economic dimensions of climate change, revealing the need for a more comprehensive and inclusive approach to climate action planning. Most importantly, the critique notes that the framework falls short of what was promised and needed, therefore it could mislead the public into believing that Canada is doing its fair share to fight climate change. Overall, the PCF was an initial attempt rather than a comprehensive strategic plan.

Following the PCF, Canada’s Changing Climate Report was published in 2019 to provide a comprehensive assessment of climate change impacts on Canada, and the National Assessment reports followed suit. These reports are foundational for the publication of the National Adaptation Strategy (NAS) in 2022. This strategy outlines the climate context within Canada, proposes climate resilience pathways, and delegates federal roles and responsibilities. The NAS mentions that current actions being taken in Canada are often “insufficient or disjointed” and advocates for their guiding principles to be “mainstreamed” into Canadian society to facilitate collective adaptation (Government of Canada, 2022; Vogel & Henstra, 2015). Mainstreaming refers to the “efforts to entrench a particular social value as an overarching lens through which subsequent proposed laws, policies, and programmes are evaluated”, or more colloquially, it is the uptake and consideration of climate change impacts in all facets of everyday life (Vogel & Henstra, 2015, p. 116). The four guiding principles are: respecting local jurisdictions and Indigenous rights, advancing equity and environmental justice, making risk-reducing and informed decisions, and avoiding maladaptation (unintended negative consequences). The NAS covers five systems: disaster resilience, economy, infrastructure, health, and biodiversity. The federal action plan promises to streamline adaptation initiatives, bridge climate commitments such as mitigation and conservation, and mainstream adaptation while provincial and territorial action plans promise to undertake climate change risk assessments and implement adaptation action plans.

At the provincial and territorial level, some provinces had adaptation plans in the past under previous administrations, but do not have current plans like Ontario and Quebec. This is a weakness of not having legal requirements for provincial adaptation plan, although that is beginning to change like in BC. Alberta’s climate action plan is focused on mitigation, whereas Manitoba, New Brunswick, Nova Scotia, and Newfoundland and Labrador have general climate action plan, also focused primarily on emissions reduction. Yukon, Nunavut, and Northwest Territories are a part of the Pan-Territorial Adaptation Partnerships, which focuses on climate programs targeting northern adaptation. In terms of delegating to municipalities, Ontario requires local governments to develop official city plans, and encourages the integration of climate change initiatives into the plans (Guyadeen et

al., 2018). Similarly, British Columbia requires GHG reduction targets in official city plans and Nova Scotia is the only province that has sort of required municipalities[1] to develop a climate change action plan (Guyadeen et al., 2018). Quebec has pushed for sustainable development planning for government agencies and public organizations since 2006 (Bourgeois, 2022).

Regarding municipal climate change planning, ICLEI Canada, and their Partners for Climate Protection (PCP) program (administered through the Federation for Canadian Municipalities (FCM)) provides technical and financial support for municipalities interested in engaging with mitigation and later on, adaptation initiatives (Guyadeen et al., 2018). As explained by Vogel and Henstra (2015), there are numerous roadblocks when mainstreaming and integrating climate change considerations, stemming from 'institutional constraints' and 'political barriers' (p. 116), which are explored further in Chapter 2. Anguelovski and Carmin (2011) highlight the importance of local champions in initiating and sustaining climate programs. Political willingness and adequate leadership are key to institutionalizing climate considerations within local government, as summarized by Marc Lee: "It's almost cliche these days to note that climate action is not a technical problem, but a political one- so perhaps this is just the best we can do politically right now given the power of vested interests and the complexities of Canadian federalism" (Lee, 2016, n.p.).

1.4 Research objective and questions

The structure of this thesis is as follows: Chapter 1 provided an introduction to climate impacts and adaptation planning in Canada. Chapter 2 will summarize the relevant academic scholarship in the literature regarding climate change adaptation, especially through a critical equity lens. Chapter 3 is the thesis manuscript, which includes an introduction, literature review, as well as my research methodology, results, and discussion. Chapter 4 provides the concluding remarks, as well as avenues for future research.

The objective of my research is to explore how local governments are integrating equity considerations into local climate adaptation plans in Canada. I explore the gaps that exist in climate planning through an equity lens, and observe how regional affiliation, population size, and the involvement of consulting groups may impact equity considerations and adaptation plan quality. My research questions are as follows:

4) Do Canadian municipalities consider equity in relation to adaptation planning?
5) Are vulnerable and marginalized groups included in the adaptation planning process?
6) Are local adaptation plans likely to reduce vulnerability for marginalized groups?

[1] Nova Scotia "sort of" required municipalities to develop a climate change action plan as a condition to receive a gas transfer tax, about a decade ago. But this was not a statutory requirement and municipalities had a choice to not complete an action plan and forego the revenue (Fisher, 2011)

Chapter 2: Literature Review

Academic scholarship on climate change adaptation planning encompasses multiple disciplines and themes. This literature review focuses on the theoretical foundations of vulnerability research, the multilevel governance of adaptation, equity and justice in adaptation policy, and assessing progress on adaptation policy.

2.1 Vulnerability

The concept of vulnerability in climate change scholarship has undergone significant evolution. Initially, vulnerability research aimed to discern the impacts of climate changes on human systems, drawing inspiration from studies in the natural hazards field during the 1970s and 80s (Ford et al., 2018). In the 1990s, studies began integrating vulnerability approaches into the climate change context (Ford et al., 2018). There has been plenty of criticism regarding vulnerability research, regarding its applicability, dynamicity, and scalability (Ford et al., 2018). In response to these concerns, there have been efforts to develop a comprehensive, conceptual framework for vulnerability, including terminology for vulnerable situations, a classification scheme for vulnerability factors, and a terminology for vulnerability concepts (Ford et al., 2018). The goal is to alleviate confusion in conceptualizing vulnerability, enabling clearer descriptions in specific studies and highlighting the distinctions between different vulnerability concepts and how they are operationalized. O'Brien et al. (2011) describe two forms of vulnerability: outcome and contextual. Outcome vulnerability is presented as a linear progression where a change in vulnerability is a result of climate change, whereas contextual vulnerability situates the change in vulnerability as an interconnected and ongoing social, cultural, political, and environmental process. Climate risk literature often implicitly models outcome vulnerability, although social science literature argues that vulnerability is reflective of existing socio-economic structures and path dependencies (McDowell et al., 2016). In a systematic review of the vulnerability scholarship, Ford et al. (2018) find that vulnerability is often treated as a vague concept and there is often insufficient emphasis on social drivers (meaning more emphasis is given to biophysical factors). In order to further the contextual understanding of vulnerability, Ford et al. (2018) recommend longitudinal studies, using community-based monitoring and evaluation to understand vulnerability through time. The authors also suggest nested case studies (local, regional, and national scale) to connect determinants of vulnerability and inform cross sectoral policy (Ford et al., 2018).

Adger (2006) identifies vulnerability as the potential for harm to physical and social systems because of environmental change, composed of exposure, sensitivity, and adaptive capacity. Exposure is the likelihood of experiencing climatic and socio-political impacts. Sensitivity is the degree to which a system is affected by climate change impacts, and adaptive capacity is the ability of the system to respond to and cope with impacts (Adger, 2006). Building adaptive capacity is a key strategy to improve adaptation outcomes. For example, Ensor et al. (2016) connect adaptive capacity to community-based adaptation (CBA) strategies in Timor Leste and the Solomon Islands. The researchers show how CBA strengthens adaptive capacity through community participation and the consideration of local perspectives; stronger plans tended to have higher stakeholder involvement. In a global assessment of adaptation planning, Araos et al. (2016) completed the first

systematic overview of adaptation plans. The authors found that wealth is a key indicator of adaptive capacity; in other words, the wealthier the city the greater the odds of adaptation planning occurring.

In a subsequent publication, Adger and Barnett (2009) describe the adaptation myth, originally coined by Robert Repetto (2009) as the contrast between adaptive capacity and adaptive action, illustrating how adaptive capacity is a prerequisite for adaptive action but does not guarantee it. Adaptation processes are inherently complex, due to the vast scale of climate change, the complexity of its impacts, and the mismatch between adaptive capacity and action. The adaptation myth has influenced the climate change adaptation field, questioning the presumption that adaptive capacity will automatically result in concrete action. It emphasizes the necessity for proactive and impactful strategies to address the consequences of climate change, challenging the notion that societies can effortlessly adapt to these transformations.

Social science perspectives on vulnerability emphasize the political, economic, cultural, and social context in which people experience climate change impacts and adaptation strategies emerge. A few examples of this include poverty and colonization. Scholars like Lisa Schipper have contributed to this evolution by focusing on social vulnerability within urban local climate change adaptation efforts, as well as uncovering how differing agendas can shape approaches to adaptation and vulnerability (Schipper, 2007).

Poverty and vulnerability are explored together and Eriksen et al. (2011) breakdown this interconnection through in-depth investigations. Poverty, as defined by the authors, is the deprivation of basic needs which ensure physical and social well-being, including community, rights, and freedoms going beyond financial capital. Thus, poverty is one of many key indicators of a community or an individual's ability to respond and adapt to climate change, as well as the susceptibility to harm. Poverty reduction measures can be linked with vulnerability reduction strategies but targeting one does not target both, reinforcing the adaptation myth. For example, Eriksen et al. (2011) describe how livelihood diversification, such as raising cattle, can target poverty reduction by creating a new income stream, but due to pre-existing environmental conditions such as drought, this adaptation can exacerbate vulnerability. More recently, Nelson et al. (2016) published their study on poverty reduction methods in Brazil to assess any reductions in vulnerability. The *Bolsa Familia* program utilizes conditional cash transfers, giving poor families money if their children pursue education and receive regular vaccinations. However, the authors found that direct investment in poverty reduction measures, while beneficial, were unable to reduce food insecurity or vulnerability to drought (Nelson et al., 2016). As programs like *Bolsa Familia* were implemented, the government withdrew support from emergency programs, transferring the responsibility of risk management to households, thereby increasing vulnerability to droughts (Nelson et al., 2016). Although household poverty was alleviated to a certain extent, this poverty reduction measure did not reduce vulnerability, but rather exacerbated it.

Fernandez-Llamazares et al. (2019) article explores the contextual vulnerability of Indigenous peoples, particularly how political-economic systems shape vulnerability. Using a comprehensive literature review, the authors present Indigenous people's vulnerability and exposure to environmental pollution and examples of how Indigenous communities are exercising agency to mitigate pollution at local and global scales (Fernandez-Llamazares et al., 2019). The authors detail how although Indigenous people constitute only 5% of the global

population, they account for greater than 15% of the extreme poor (Fernandez-Llamazares et al., 2019; UNPFII, 2016), and this socioeconomic discrepancy is "most likely the direct consequence of colonization and historical exclusion" (Fernandez-Llamazares et al., 2019, p. 325). Since the era of colonization, illnesses such as smallpox and measles depopulated Indigenous communities and subverted their agency (Fayazi et al., 2020). In Canada, repression and assimilation efforts pushed forth by the Canadian government and other institutions further contributed to eroding Indigenous cultures, languages, food, and traditional knowledge and livelihoods (Fayazi et al., 2020). Consequently, these long-lasting social inequalities and inhumane treatment have generated numerous barriers to climate change adaptation and have compounded environmental and social vulnerability of Indigenous peoples (Fayazi et al., 2020). Fayazi et al. (2020) describe the aftermath of the 2017 and 2019 floods in southern Quebec, particularly investigating the recovery process in the Kanien'kehá:ka community of Kanesatake. One of the unique challenges facing the Kanesatake community is the lack of secure land tenure: Land ownership is fragmented and there is no official "reserve" status, rendering the community incapable of "cohesive land management" (Fayazi et al., 2020, p. 49). The interviews conducted by the authors illustrate the lack of civil services and multi-level communications between First Nation communities and governments, and land dispute tensions are eroding adaptive capacity and social capital.

2.2 Multi-Level Adaptive Governance

Adaptation is a multi-level governance problem due to climate change being a multi-jurisdictional, interconnected, and complex problem. Effective adaptation will require a multilevel governance approach that can address a multitude of issues at difference scales and in multiple sectors. Cities in Canada are embedded in a larger governing system, and studying multi-level governance helps to understand the role that local governments play in adaptation and why. This context can vary across different countries, but in Canadian federalism, there is shared or devolved jurisdiction over issues pertinent for adaptation planning. Powers and responsibilities of local governments are set out by the provinces, which can also vary across the country. At the heart of multi-level governance is the question of "who is responsible for what?" or more eloquently, "what level of government is responsible for what action?". This subsection will begin with an overview of multi-level governance, including a brief description of the different types of governance modes and policy instruments that characterize adaptive governance. Then, devolving government responsibility and the local framing of adaptation will be reviewed through a historical lens.

2.2.1 What is multi-level governance?

Multi-level governance is a term that emerged to understand the decision-making process within the EU (Eckersley, 2016), and has since been applied to describe increasingly interconnected and interdependent relationships between different levels of government and other actors in the policy-making process. The OECD (Box 5.2., 2022) defines multi-level governance as the "interaction among levels of government when designing and implementing public policies with subnational impact", and decentralization is "the transfer of range of powers, responsibilities and resources from central government to subnational

governments." Vertical interaction is communication and collaboration among different levels of governments, whereas horizontal interaction is across the same level of government and these interactions can include a broader range of stakeholders like NGOs, private actors, civil society groups, etc. (OECD, 2022; Eckersley, 2016).

Utilizing a historical lens, Eckersley's (2016) article "Cities and climate change: how historical legacies..." describes how historic institutional contexts influence the approach that local governments use to address novel issues like climate change adaptation. Within the English governing system, municipalities act as agents of the central government, responsible for disseminating the policies of a larger, overbearing institution. In contrast, German municipalities function under the guiding principle of "lokale Selbstverwaltung" or "local self-administration" which grants them the ability to uptake responsibilities as they find helpful for their community and greater financial capacity to act in the interest of the community. German municipalities have more direct control over the policy creation, administration, implementation, monitoring and evaluation, and accountability compared to the English municipalities. Eckersley (2016) conducts a historical analysis and case review of how multi-level governance in Germany and England differ, producing different roles, responsibilities, and power structures which enable local governmental actors to act with different capacities. Concerning the climate emergency, German municipalities have more authority and accountability to enact policies for the betterment of the local communities. Contrasted by the English system, information and guidance must be disseminated from the central government, leaving municipalities grappling with urgent climate hazards without leadership or ability to initiate adaptive action.

Lesnikowski et al. (2020) detail how national policy contexts shape adaptation in the local context. Direct subsidization, public provision/oversight, institutionalized voluntarism, and regulatory corporatism are four interconnected approaches to implement policy. To summarize, the authors found that direct subsidization is the smallest share of the four styles, explained by the limited capacity of local governments. Local governments also tend to uptake sustainability policies if higher levels of government facilitate the coordination, highlighting the need for strong leadership and clear divisions of responsibility in multilevel governance. Local politics, including climate denial, uncertainty, and associated climate politics are important factors that influence policy instrument choice too, which need to be further explored. Bulkeley and Betsill (2013) discuss how multi-level governance structures create multiple spaces and responsibilities for implementing policies and addressing impacts, but there is a gaping absence of strong leadership. Network governance and participation within networks is one avenue through which municipal and local governments can access resources and financial support. Nalau et al. (2015) discuss the distribution of governing power in the paper "Is adaptation a local responsibility?". Although there is growing acknowledgement of local governments as front-line actors, the key problem with framing climate adaptation as a local responsibility is the lack of support, resources, organization, and leadership that accompany the delegation of responsibility. Similarly, Corfee-Morlot et al. (2011) found that climate policy at the city-scale remains fragmented and needs to facilitate better decision-making, particularly through boundary organizations. Boundary organizations are institutions that facilitate the flow of information between decision-makers and rsearchers, playing a crucial role in bridging the divide between science and policy (Corfee-Morlot et al., 2011). Naomi Bick's (2021) dissertation "Cities Leading the Way" highlights how city and state governments in the US have adopted

and implemented climate policies in the absence of comprehensive federal climate change policies. Bick's findings support that a sustainability framing of climate change is critical to engage elected officials, who are primarily concerned about economic growth (Bick, 2021).

2.2.2 Multi-level governance in the Canadian context

Multi-level governance is highly relevant for understanding the Canadian context due to the country's federal structure: federal, provincial, municipal, and Indigenous governments, each with its own jurisdiction and responsibilities. Cargnello and Flumian (2017) use the concept of multi-level governance to contextualize trends in Canadian governance: "rise of digital culture, the disintermediation of traditional authorities, and the increasingly distributed nature of governance" (p. 605). To cope with these changing trends and decentralization, the authors suggest that new multi-level arrangements combined with changes to public leadership are necessary to facilitate out-come based governance (p. 611). Although multi-level governance framework is crucial to understanding the workings of Canadian governments in general, researchers like Young (2013) have shown that there are "relatively few instances of true multilevel governance exist in Canada, in the sense of genuine, issue-centric, tripartite forums where three levels of government deliberate jointly on policies" (Cargnello & Flumian, 2017, p.613). Henstra (2015) highlights the challenges posed by jurisdictional divisions and public-private divides in climate-affected systems, suggesting that adaptation scholarship has shifted its focus to governance studies to understand and overcome these challenges. Henstra's (2015) research underscores the significance of multi-level governance in the Canadian context to foster effective adaptation by outlining the necessity for collaboration and coordination among government levels. This discrepancy between the collaboration that is supposedly happening versus policy coherence is starting to be highlighted through the work of scholars like Justin Rain, a PhD candidate at Toronto Metropolitical University. Studying housing policy in Canada, Rain (2020) showcases how communication hurdles and federalist structures have left many people vulnerable and in need of housing.

2.3 Equity and Justice in Adaptation Planning

Section 2.2 describes the limits of focusing exclusively on physical climate change risks without a contextual understanding of social drivers of vulnerability. Equitable or just adaptation refers to climate change adaptation that is rooted in fairness, ensuring that everyone, especially those who are marginalized and socially vulnerable, have access to resources and opportunities to adapt to the adverse impacts of climate change. This principle is critical because it strives to address pre-existing inequalities that emerge from socio-political and economic structures, while enabling communities to adapt to climate change. This subsection of literature will begin with how equity is connected to distributional and procedural justice, discuss equity/justice in relation to urban climate action, and provide examples of maladaptation.

2.3.1 What is equity/justice? Why does it matter?

Sovacool and Linner's (2016) comprehensive book "The Political Economy of Climate Change Adaptation" outlines the relationship between equity and distributional and procedural justice. Equity, in general, is the fair treatment of all

people “without regard to factors such as age, race, class, gender, or ethnicity” (Sovacool & Linner, 2016, p. 138). Distributional justice is the distribution of positive and negative impacts of any event, policy, or action, and can be understood in three ways, as summarized by the IPCC Sixth Assessment Report: “fairness between individuals, fairness between states, and fairness between generations” (IPCC, 2022, p. 160). Fairness between individuals is the concept that adaptation activities should protect all members of the community without creating risks for others. Fairness between states is the idea that although all nations should respond to climate change, responsibilities and actions may vary to reflect historical and current emissions and power relations. Fairness between generations is the principle that future generations “are guaranteed at least a minimally decent life”, reflecting the growing climate risks for generations to come (IPCC, 2022, p.160). In climate change adaptation, distributive justice is concerned with who is receiving justice (which demographics), what is being distributed (positive and negative impacts of climate change and policy), and how justice is being distributed (equality, preferential treatment, etc.) (Sovacool & Linner, 2016, p. 140). Likewise, procedural justice is the assessment of how fair the decision-making process is and how inclusive the procedures are. Scholars highlight fairness, transparency, legitimacy, participation and inclusivity as key characteristics of procedural justice (IPCC, 2022). Procedural justice is paramount to democratic decision-making, promoting ideological plurality and accountability (Sovacool & Linner, 2016). Distributional and procedural justice are the central pillars of equity, and my research aims to assess both in municipal adaptation planning through two stages in the research design described in further detail in section 3.

Similarly, “Roadmap towards Justice...” by Shi et al. (2016) reframes adaptation to address equity by illustrating four key avenues: increasing community participation, prioritizing adaptation in expanding cities and areas with low financial capacity, restructuring current multi-level governance systems to accommodate shifting and increasing responsibilities on the local level, and finally, designing for justice through assessing the limitations of public-private partnerships in urban development, green gentrification, etc. and bridging the gap between urban development theory and urban planning. This article has contributed to a growing body of literature that recognizes the need to address the disproportionate impacts of climate change and ensure that adaptation efforts are equitable and socially just. Integrating equity into infrastructure design is another recommendation made by Shi et al. (2016). LaDuke and Cowen (2020) explore the history of Canadian infrastructure through an Indigenous and feminist lens in “Beyond Wiindigo Infrastructure", highlighting the colonial and capitalist conquests and legacies of Turtle Island (Canada). This is an example of how large-scale infrastructure projects that are framed as a means to advance economic development can have catastrophic impacts on disempowered social groups, hence the need for an equity and justice lens on planning processes and decisions. The authors situate the Canadian Pacific Railway (CPR) as an example of how infrastructural projects across Turtle Island are rooted in the destruction of Indigenous, Black, and POC communities. CPR was financed by wealth generated by plantations in the southern United States and Caribbean and built by Chinese migrant labor (LaDuke & Cowen, 2020).

Consequently, the buffalo populations were decimated, compromising the livelihoods of communities living in the plains. LaDuke and Cowen contrast the historical legacy of CPR with the current potential of physical infrastructure: reclaiming and retrofitting existing ‘Wiindigo’ (cannibalistic) infrastructure to support

community survival rather than capital gain of the few is a key step for BIPOC communities to attain self-determination, unity, and self-sufficiency.

However, there are many economic barriers and risks that underlay the transition of current, exploitative infrastructural design towards a more holistic, community-oriented vision. The principles of distributive justice behind LaDuke and Cowen's publication, such as "who is benefiting from green or climate-oriented infrastructure projects?" and "Are infrastructural projects, adaptation plans challenging the status quo?" will follow through into the heart of my research.

2.3.2 Equity and justice in relation to urban climate action

Critical perspectives on equity and adaptation argue that adaptation planning must integrate environmental and social goals in a way that address power structures and injustice. Nightingale et al. (2019), for example, integrate political frameworks around climate change with social justice movements, showcasing their inherent interconnectedness. They argue that in order to facilitate just adaptation, adaptation policies must support self-determination, social inclusion, and local agency and dignity. The failure to take an equity lens on adaptation heightens the risk of maladaptation. Juhola et al. (2015) define maladaptation as negative consequences of adaptation measures and stress the importance of developing the research capacity to assess how maladaptation influences vulnerability, and how vulnerability can shift from different actors. The authors describe three types of maladaptive outcomes: rebounding vulnerability, shifting vulnerability, and eroding sustainable development. Rebounding vulnerability is when the adaptive action increases current or future risk for the implementor; for example, if the city is planting trees to shade a building, it may help bring energy costs down in the summer, but it may also create the risk of those trees damaging the building during an intense storm (Juhola et al., 2015). Shifting vulnerability is when the adaptive action increases current or future risk for external actors; for example, if a city encourages homeowners to re-engineer their properties, this may cause increased runoff into a water drainage system in a different jurisdiction unequipped to handle the influx (Juhola et al., 2015). Eroding sustainable development is when the adaptive action increases emissions and negatively impacts environmental and socio-economic systems; for example, a city facing a potable water crisis may invest in water desalination plants, but this infrastructure increases GHG emissions overall (Juhola et al., 2015). The examples provided above reinforce how critical it is to consider maladaptation both as an outcome and as a process and how sociocultural determinants can exacerbate vulnerability.

In terms of planning, Schipper (2020) articulates that causes of maladaptation in planned interventions are due to "poor design and sloppy application by outside actors who have funds or project expertise, but little knowledge of the social or ecological contexts of the locations in which they are implementing projects" (p. 412). She goes on to highlight how the unequal power dynamics between those implementing adaptation strategies and communities 'expected' to adapt needs further attention. To address issues regarding poor adaptation design and tensions between stakeholders, Schipper (2020) recommends participation of beneficiaries and civil society groups, and implementation of bottom up-community initiatives. Ideas of involving the public are not novel, as Arnstein's "Ladder of Citizen Participation" was conceptualized in 1969. This is a model of eight levels of participation that highlight the progression of citizen involvement in decision-making processes, from manipulation to citizen control. Schipper (2020) argues that

maladaptation can arise from either direct or indirect exclusion of vulnerable communities or inappropriate/misunderstandings of risk and social vulnerability, which aligns with the lower rungs of Arnstein's ladder since citizen participation is minimal/suppressed, leading to decisions that are not reflective of the community's needs. On the other hand, effective and just adaptation strategies that avoid maladaptation require a high level of citizen participation, where people have the power to negotiate and influence the decision-making process (Schipper, 2020; Arnstein, 1969). In summary, Schipper's concept of maladaptation and Arnstein's ladder both emphasize the importance of participatory and inclusive decision-making to address root causes of vulnerability.

Bridging Nightingale et al. (2019) and Shi et al. (2016), "The Political Economy of Climate Adaptation" by Sovacool and Linner (2016) broadly discusses maladaptation through eight adaptation projects from around the world, presenting the struggle of reconciling the need for urgent action with the prioritization of just adaptation. The four key maladaptive processes the authors highlight are: enclosure, private sector takeover of public assets and responsibilities; encroachment, protecting and prioritizing built environments over natural, biodiverse regions; exclusion, limiting stakeholder participation; and entrenchment, reinforcing status quo, power inequalities, and concentration of wealth. Expanding on enclosure, or the private sector involvement in public projects, Angeulovski et al.'s (2016) publication highlights the tradeoff cities are making between economic development and human wellbeing. One of the challenges planners are facing is that private actors and their interests are dictating public planning projects, reproducing neoliberal hegemonies, as discussed in section 2.2. An example of green infrastructure and its consequences is presented in "Assessing green gentrification..." by Anguelovski et al. (2018). By analyzing 18 green areas in Barcelona, Spain the authors found that not only did green projects contribute to creating healthier areas, they also resulted in the displacement and dispossession of local communities. Tenants are confronted with rising rent and cost of living due to green infrastructure investments raising property values while property owners reap the benefits. The authors note that green amenities in poorer neighborhoods were of lower quality compared to wealthier neighborhoods. Similarly, Keenan et al. (2018) studied Miami-Dade County in Florida to see how property values are affected by climate change adaptations. The authors found that climate gentrification happens in three pathways: moving from a low climate change resilience zone to a 'superior' location, only wealthier households being able to afford rising cost of living due to climate change, and public investments into green infrastructure increasing property values. Therefore, promoting climate resilient infrastructure may have maladaptive consequences of entrenching financial inequalities and furthering gentrification.

In order to recenter urban planning to target socio-spatial inequalities, there must be a critical understanding of how marginalized groups are being impacted and whether economic gains are prioritized over the wellbeing of people. By discussing the growing privatization of urban services as a new form of economic restructuring happening within cities, Bulkeley and Betsill (2013) allude to the neoliberal "takeover" of government, and this relationship between is explored further in the 2022 publication: "Planning use values..." by authors Oulahan and Ventura. This article describes flood risk governance in Vancouver and the transition from public provisioning to private sector management. Due to federal government budget cuts and rollbacks, particularly of the Disaster Financial Assistance Arrangement, private overland flood insurance became available in Canada in 2015. Previously, the province of British Columbia devolved flood management

responsibility to municipalities “without transferring the resources or revenue streams to handle those new responsibilities” (Oulahan & Ventura, 2022, p. 4).

Starting with a historical narration of Vancouver’s growth, the authors puzzle together how the commodification of land and devolving government responsibility translates into “transferring the onus for physical adaptation to private developers” and how 'contracting-out' “has thus become highly attractive for financially restricted municipal governments with competing priorities” (Oulahan & Ventura 2022 p. 14). ‘Contracting-out’, like public-private partnerships, is one way for governments to foster economic competition and reduce the role of direct government involvement in service provision (Eliadis et al., 2005). Municipalities are operating under a neoliberal scheme and are unfortunately reliant on private sector capital to implement adaptation efforts; private insurers, development pressures, and necessity of tax revenue are leaving municipalities with very few choices. In Vancouver, people who can afford to purchase private insurance are able to reside in flood prone, waterfront properties, while people who are unable to access or afford private flood insurance are left unprotected, exacerbating socio-spatial inequalities.

Curran and Hamilton (2012) present an alternative understanding of greening a neighborhood, through the “just green enough” ideology. Their case study is situated in Greenpoint, Brooklyn and the authors use interviews as a method to understand community perceptions of how to reclaim Greenpoint from its historical use as an industrial zone for oil refining and the consequential environmental contamination. The residents overall advocate for historical injustices to be recognized and the community to directly benefit from clean up and greening efforts. The residents’ collective perception of how they envision the future of Greenpoint is a testament to community identity. Planners act as a bridge between government and community, but it is imperative to realize that communities are situated and integrated into the environment. Climate policy is nestled in the intersection of colonialism, capitalism, and anthropogenic climate change. Understanding how settler colonialism and capitalism in Canada perpetuates socio-spatial inequalities is key to creating policy that addresses these impacts.

2.4 Comparative Research in Adaptation Tracking

2.4.1 Assessing adaptation policy

Adaptation tracking is the process of analyzing adaptation plans and policies for their quality, impact, and effectiveness. Assessing adaptation policy is crucial for several reasons. Firstly, it helps track whether the policy is effective in reducing vulnerability and targeting relevant climate change impacts. Secondly, it helps uncover maladaptation or unintended consequences of the strategy, as well as any gaps that need to be addressed. Lastly, it provides an opportunity to highlight success and improve future decision-making processes.

Ford et al. (2013) developed an initial typology to compare different approaches to adaptation tracking. Outcome-based adaptation tracking focuses on understanding the effects of adaptation action for different resilience and vulnerability reduction goals. Output-based adaptation tracking identifies policies, programs, projects, and other measures being implemented under the name of adaptation. Adaptation policy analysis literature largely focuses on comparing and monitoring adaptation policies within local contexts and on a larger, comparative scale. In other words, it adopts an output-based approach to adaptation tracking.

This is the area that this thesis situates itself in by comparing municipal adaptation plans in the Canadian context.

Adaptation policy assessment faces several challenges compared to mitigation policy assessment. Adaptation policies deal with complex and uncertain future climate scenarios, making it difficult to predict the effectiveness of these policies and to quantify their benefits (UNEP, 2017). Since adaptation is highly context-specific, appropriate and efficient indicators vary greatly, making it challenging to develop universal or standardized criteria (UNEP, 2017). The benefits of adaptation measures can often be invisible: how do you measure avoided impacts? In comparison, mitigation policies aim to reduce GHG emissions and their impacts are typically easier to quantify (e.g. tons of CO2 emissions avoided), less context-specific, and have more universally applicable assessment criteria, such as cost-effectiveness and potential for emission reductions (UNEP, 2017).

Dupuis and Biesbroek (2013) address the 'dependent variable problem' which is a common issue within climate policy literature. The authors describe the dependent variable problem as the uncertainty and incomparability of what is being measured when it concerns adaptation policy. Globally, there was uncertainty regarding what constituted an adaptation or an adaptation policy, and what indicators could be used to measure adaptation. This posed a challenge for meaningful policy comparisons, transnational knowledge exchange, and research design. To address this variability, the authors present a matrix of four meta-types of adaptation with varying intentionality and substantiality. First are contiguous policies which are policies that "enable adaptation to climate change to take place, but hardly stimulate it", or in other words, these policies have the potential to address climate change impacts (low intentionality) but are not designed to address vulnerability (low substantiality) (Dupuis & Biesbroek, 2013 p. 1480). Contributive policies are primarily designed to address climate variability and extreme natural hazards, such as flooding or disaster management. These policies help reduce climate vulnerability by designing strategies based on historical events (high substantiality), but contributive policies are not designed to manage the intensifying risks associated with anthropogenic climate change (low intentionality) (Dupuis & Biesbroek, 2013, p. 1481). Symbolic policies are policies that directly address climate change (high intentionality) but have no implementation efforts to genuinely reduce vulnerability (low substantiality) (Dupuis & Biesbroek, 2013). These policies often arise due to increasing global social pressure to address climate change and to gain political clout, but they create an avenue for sincere adaptation planning. Finally, concrete policies are policies that explicitly address anthropogenic climate change and make efforts to reduce vulnerability (high intentionality and substantiality).

Another problem the authors mention is the vagueness between evaluating progress in policy versus evaluating policy outcomes. For instance, evaluating progress in policy would involve asking how climate change impacts are being considered in previous and current policy or why there is great variability in uptake of adaptation efforts; whereas, evaluating policy outcomes would involve research questions like (but not limited to) whether the policy reduces vulnerability or increases adaptive capacity (Dupuis & Biesbroek 2013). The authors directly recommend researchers to be clear regarding the material they are discussing and the angle of analysis. For this study, I will primarily be assessing the adoption of an equity lens in adaptation documents and investigating the variability in uptake.

2.4.3 Tracking local adaptation planning

For adaptation to be realized, policies at the local, regional, national, and international levels need to be aligned and mutually supportive. Adaptation governance research describes how different approaches to adaptation planning and implementing reflect different governance modes. Bednar and Henstra (2018) identify four types of adaptive governance: hierarchical, top-down authority involving legislation and regulation as the methods to exert change; market-based approaches that focus on demand and supply as well as market intervention and regulation; network governance that focuses on building horizontal linkages between governmental, private, and NGO sectors; and finally, community-based governance that is bottom-up and strives for self-regulation and voluntary participation. Multi-level governance is a framework that helps in comprehending the role of local governments in climate change adaptation and the decisions they make, including the selection of policy instruments. Different forms of governance underlie different types of policy instrument types which may impact the quality and content of climate action plans. Henstra (2016) outlines four categories of policy instruments that governments rely on to govern adaptation. The categories reflect variations noted above in adaptation governance approaches: nodality (or information driven) instruments, authoritative (regulatory) instruments, treasure-based (financial) instruments, and organizational instruments. Nodal instruments use knowledge mobilization to aid adaptation policy responses. Essentially, adaptation can happen if targeted groups are knowledgeable about climate change and knowledgeable about how to adapt. Authoritative instruments focus on using legislation and regulation to permit or forbid different forms of action. Treasury instruments are a mix of direct program spending, financial incentives, and taxation to motivate adaptive action. Organizational instruments are programs and services organized by government entities to implement climate change adaptation policy goals. This can happen through demonstration projects, public assets management, or resource procurement, including human capital (Henstra, 2016 p. 511). Lesnikowski et al. (2020) emphasize that the selection of policy instruments is shaped by various factors, such as the specific impacts of climate change, the governance context, and the resources available for adaptation. They further challenge the assumption that a higher diversity of policy instruments indicates a more advanced adaptation policy portfolio or a greater likelihood of successful climate risk reduction based on data quality shortfalls.

Content analysis is one of the key methodological tools used in adaptation tracking. It involves analyzing various forms of content, such as policy documents and reports to assess and compare adaptation actions across different regions or sectors (Berrang-Ford et al., 2019). Other methods can include longitudinal tracking of specific indicators, structured surveys, interviews, case studies, and systematic reviews. Plan evaluation methodologies in the urban planning literature have been applied to assess local climate policies in the US and Canada. Berke & Godschalk (2009) and Lyles & Stevens (2014) pinpoint six principles used in plan evaluation: goals, fact base, public participation, inter-organizational coordination, and implementation and monitoring. These principles are generally regarded as “standard” and are applicable temporally, spatially, and across sectors (Woodruff & Sults, 2016). Guyadeen et al. (2019) analyze municipal climate change plans in Canada by pulling the 100 most populous municipalities in Canada and qualitatively categorizing climate change plans within the eight plan equality indicators. The authors found that climate change mitigation receives greater attention by policy makers rather than adaptation, but it is important to note that although their research design involves assessing climate plans, very little of the content they

analyze is about adaptation. The authors also conclude that implementation, monitoring, and evaluation are lackluster in the Canadian plans, which echoes similar findings in Woodruff and Stults' analysis of US plans (2016). This study focuses almost entirely on mitigation planning, however, and does not capture plan content from local adaptation strategies.

The adoption and content of climate change adaptation plans are influenced by a range of factors which are categorized by Reckien et al. (2015). By analyzing 200 cities across 11 European countries, the authors tested institutional factors such as political leadership, socio-economic factors such as financial capacity, environmental factors such as extreme weather, and vulnerability factors such as adaptive capacity. Overall, the authors conclude that adaptation planning was mainly reactive or ad hoc to past climate events rather than anticipatory for future climate change.

In a study by Shi et al. (2015), which explored the various indicators of progress in climate adaptation planning in 156 US cities, political commitment, municipal expenditure per capita, and experience of climate change were the three most statistically significant indicators of adaptation planning status. Municipalities describe lack of resources, lack of local leadership, and lack of technical capacity as the top barriers for adaptation. Increasing responsibility at the local level without the proper financial, administrative and technical support is an impediment to the larger effort, as illustrated through the Vancouver flood risk management example in section 2.3.3. Climate change denial and the politicalized nature of climate change further obstructs local agencies from accessing resources and funding to implement adaptation strategies. Similarly, Woodruff and Stults (2016) showcase through an empirical analysis of US local adaptation plans that most plans lack a strong implementation process and uncertainty analysis. Both gaps raise concerns on how plans are being utilized on the ground and how negative externalities and maladaptation are considered.

Few studies have examined equity dimensions of local adaptation plans, but recently Diezmatinez and Gianotti (2022) examine the integration of justice concerns into climate mitigation planning in large US cities. Employing a content analysis approach, the authors study the occurrence of four policy tools in mitigation plans: justice partnerships, equity advisory boards, equity tools, and justice indicators being used to operationalize and implement climate policies. The study finds that while only 58 of the 100 surveyed cities have mitigation plans, references to equity are growing. The authors observe a sectoral approach to addressing equity; however, it does not reflect the intersectional and compounding nature of climate vulnerability. They also find a lack of "specific strategies to operationalise just climate policies on the ground" (p. 5). Meerow et al. (2019) also explore social equity in resilience plans created by member cities of the 100 Resilient Cities program. Systematically reviewing 10 resilience plans from the program, the authors found that when cities do have justice-oriented information, it is situated in addressing distributional equity through "equitable access to infrastructure, goods, services and opportunities" (p. 805). Few plans identified structural factors (such as systemic racism) while acknowledging the disproportionate impacts of climate change on the community. Likewise, Fiack et al. (2021) assessed 22 climate change adaptation plans created by large US cities for social equity concerns. They found that distributional justice concerns were framed as public health concerns with strategies aiming for improved environmental quality and economic growth. Essentially, the authors allude to the fact that there is little motivation to improve social equity for the sake of social equity, but social equity is

rather a co-benefit of improved environmental quality and economic growth. None of these studies examine adaptation justice from a Canadian municipal perspective. This thesis aims to fill this gap.

Chapter 3: Manuscript

3.1 Introduction

The growing impacts of climate change are pushing individuals, communities, and institutions to engage with climate change adaptation that aims to minimize the adverse impacts of climate change and exploit potential opportunities. Adaptation encompasses a wide spectrum of strategies, ranging from infrastructural changes and technological innovations to shifts in governance structures and community-based initiatives (Berrang-Ford et al., 2021).

Adaptation is gaining traction as a central tenet of climate policy due to the recognition that mitigation efforts alone are insufficient to counteract the current and future impacts of a changing climate (IPCC, 2022). Given the inertia in the climate system and the inevitability of some level of warming, adaptation becomes imperative to cope with the resultant impacts that are already embedded in the Earth's climate system (IPCC, 2022). The growing focus on adaptation is also propelled by an evolving understanding of climate justice, recognizing that vulnerable and marginalized communities experience disproportionate impacts, necessitating a shift toward adaptation policies that address existing and potential inequalities (Adger et al. 2009; O'Brien et al., 2007).

Local governments play a pivotal role in the adaptation policy and governance space due to their direct connection to communities, proximity to the impacts of climate change, and their responsibilities for essential services and infrastructure. Increasing urbanization and concentration of assets and people in cities further makes cities a key player (Cortekar et al., 2016). Local governments and cities are responsible for providing essential services such as water supply, waste management, and emergency response. The impacts of climate change can directly affect these services, making adaptation planning critical for ensuring the continuity and resilience of these critical functions. Furthermore, land use planning and zoning regulations often fall to local authority, and integrating climate considerations is essential for climate-resilient infrastructure. Scholars have highlighted the critical role of political will, commitment and community support in enabling effective municipal climate change adaptation (Nalau et al., 2015; Rogers et al., 2023).

Local governments are directly connected to vulnerable and marginalized populations, and have the potential to address local disparities while contributing to a more just and equitable distribution of the benefits and burdens of adaptation strategies. Adaptation assessment work has long highlighted a gap in whether adaptation meets the needs of the most vulnerable, or indeed worsens inequalities that drive social vulnerability (Adger, 2006; Anguelovski et al. 2016). Araos et al. 2021 found that there is inadequate attention in the literature to the equity and justice dimensions of adaptation, though this is changing as evidenced by studies from the US by Diezmartinez and Gianotti (2022), Meerow et al. (2019), and Fiack et al. (2021). This study aims to address this gap in the context of Canadian local governments, by assessing the equity considerations within adaptation plans and the adaptation planning process.

3.2 Literature Review

3.2.1 What is equitable adaptation? What approaches exist in the literature for operationalizing this concept?

Singh et al. 's (2022) paper “Interrogating ‘Effectiveness’ in Climate Change Adaptation” provides a valuable avenue to explore adaptation. Rather than viewing effectiveness through a narrow lens, Singh et al. explore adaptation on a spectrum from process-based frames to normative (outcome-based) frames, outlining 11 guiding principles. Different ideologies and epistemologies underlie the different frames: “Operationally, what this suggests is that choosing one frame over another can privilege or silence certain types of outcomes, with direct implications on tracking adaptation progress and building adaptive capacity of the most vulnerable” (p. 659). In general, the goals and aims of adaptation are: be efficient in minimizing costs and maximizing benefits, increase community wellbeing, reduce vulnerability, enhance resilience, be sustainable, and avoid maladaptation. Some of the processes we engage in to achieve these goals are: ecosystem- and community-based adaptation and adaptive governance. Equity and justice within adaptation is not only a goal but must be integrated into the adaptation process to ensure social justice is a priority. Similarly, effective adaptation as transformation is not just a goal, but a process to challenge socio-structural power imbalances that entrench vulnerability. Research and literature within climate vulnerability reflects the polysemic nature of adaptation and these frames collectively underscore the importance of adopting holistic, inclusive, and context-specific approaches.

Canada is a multi-level governance system, and various levels of government share responsibilities and authority in policy-making. The federal government sets national targets and climate policies and regulations such as carbon pricing and emission reduction targets.

Lesnikowski et al. (2020) detail how national policy contexts shape adaptation in the local context. Direct subsidization, public provision/oversight, institutionalized voluntarism, and regulatory corporatism are four interconnected approaches to implement policy. To summarize, the authors found that direct subsidization is the smallest share of the four styles, explained by the limited capacity of local governments (Lesnikowski et al., 2020). Provincial and territorial governments can design and set their own climate targets, with regional considerations.

Municipal governments can create and implement local climate action plans, and have responsibilities regarding land use planning, infrastructure, and community building. Coordination, jurisdictional conflicts, policy coherence are all challenges plaguing Canada’s governance system (Parry et al., 2022). Network governance and participation within networks is one avenue through which municipal and local governments can access resources and financial support. At the heart of multi-level governance is the question of division of responsibilities. Nalau et al. (2015) discuss the distribution of governing power in the paper “Is adaptation a local responsibility?”. Although there is growing acknowledgement of local governments as front-line actors, the key problem with framing climate adaptation as a local responsibility is the lack of support, resources, organization, and leadership that accompany the delegation of responsibility. Local governments also tend to uptake sustainability policies if higher levels of government facilitate the coordination, highlighting the need for strong leadership and clear divisions of responsibility in multilevel governance (Rogers et al. 2022). Although the principle and practice of subsidiarity (Marshall, 2008) may empower local government in the short-term, it also introduces challenges related to distribution of responsibilities, inconsistent policies, and limited capacities. Local politics, including climate denial, uncertainty,

and associated climate polarization are important factors that influence policy instrument choice too, which need to be further explored.

Adaptation policy analysis literature focuses on comparing and monitoring adaptation policies within local contexts and on a larger, comparative scale. This is the area within adaptation that this paper situates itself in, conducting a review and comparing municipal adaptation plans in the Canadian context. The adoption and content of climate change adaptation plans are influenced by: institutional factors such as political leadership, socio-economic factors such as financial capacity, environmental factors such as extreme weather, and vulnerability factors such as adaptive capacity (Reckien et al., 2015).

Municipalities describe lack of resources, lack of local leadership, and lack of technical capacity as the top barriers for adaptation, while political commitment, municipal expenditure per capita, and the experience of climate were significant indicators of adaptation planning status (Shi et al., 2015; Rogers et al., 2022). Increasing responsibility at the local level without the proper financial, administrative and technical support is an impediment to the larger effort.

3.2.2 How does the adoption of an equity lens improve adaptation planning?

Climate adaptation plays a crucial role in advancing equity by addressing the disproportionate impacts of climate change on vulnerable and marginalized communities. The fair and just distribution of benefits and burdens from adaptation measures ensures that vulnerable populations receive adequate support and protection. Equity, in general, is the fair treatment of all people “without regard to factors such as age, race, class, gender, or ethnicity” (Sovacool & Linner, 2016, p. 138). Distributional justice is the distribution of positive and negative impacts of any event, policy, or action, and can be understood in three ways, as summarized by the IPCC Sixth Assessment Report: “fairness between individuals, fairness between states, and fairness between generations" (IPCC, 2022, p. 160). In climate change adaptation, distributive justice is concerned with who is receiving justice (which demographics), what is being distributed (positive and negative impacts of climate change and policy), and how justice is being distributed (equality, preferential treatment, etc.) (Sovacool & Linner, 2016, p.140). Likewise, procedural justice is the assessment of how fair the decision-making process is and how inclusive the procedures are. Scholars highlight fairness, transparency, legitimacy, participation and inclusivity as key characteristics of procedural justice (IPCC, 2022). Procedural justice is paramount to democratic decision-making, promoting ideological plurality and accountability (Sovacool & Linner, 2016).

Climate-Ready Boston (CRB), an ongoing initiative by the City of Boston, is a climate adaptation strategy that has integrated an equity lens into its planning and implementation processes. The aim of this strategy is to address the city’s climate vulnerabilities while making a commitment to foster equity and social justice through engaging with marginalized community members (Malloy et al., 2022). The authors use the following three metrics for evaluating just adaptation: the representation of vulnerable people in the decision processes, the framing of adaptation goals, and the participation of socially vulnerable groups in the policy implementation process (p. 4). The authors detail how the coalition advocacy groups managed to coordinate their actions, particularly around framing transformation as goal not only to address flooding, but also address “access to jobs, mobility, affordable housing, and open space” (p.10). However, regarding inclusive representation, CRB struggled to fund

and give agency to the steering committee representing socially vulnerable groups. The authors concluded that the just adaptation coalitions did not have any noticeable influence on policy (p. 10). Furthermore, when evaluating community engagement, Malloy et al. (2022) note how forums were conducted unidirectionally for outreach and education with little to no opportunity for discourse. Community engagement was situated in the 'tokenism' rungs of Arnstein's (1969) "Ladder of Citizen Participation", characterized by informing and placating the public rather than meaningful exchange of power and decision-making. Although the CRB attempts to integrate equity and social justice considerations in climate planning, the predominant technocratic framing of climate-related risks overshadowed the goals of the just adaptation coalition. Flood mitigation designs reigned supreme over other mitigation strategies that could have produced co-benefits to address structural drivers of inequity such as affordable housing and access to jobs. Although the language in adaptation documents is evidence that equity and justice considerations are being integrated into the planning process, Malloy et al. (2022) allude to the influence of path dependency when assessing the shortcomings in integrating justice in policy implementation.

Climate adaptation literature is beginning to discuss the economization of vulnerability (Friedman, 2023), where issues in climate vulnerability are being procedurally linked to solutions rooted in economic growth. By conflating vulnerability reduction with promoting economic growth, interventions are inconsiderate to maladaptive consequences because adaptation decisions are prioritized by return on investments: "The national government [Antigua and Barbuda] established the adaptation economy through weaving together competing definitions of vulnerability from climate financing, vulnerability reduction, and development planning discourses to identify areas with the highest vulnerability that could benefit from climate resilient development" (p. 9). This example highlights how devolving responsibilities and competing priorities culminated in exacerbating socio-spatial inequalities. The adoption of an equity lens in adaptation planning is critical to spotlight "that failing to focus on structural conditions of inequality, such as poverty or exclusion, allows vulnerability to persist under the guise of socially just climate adaptation and distracts from building adaptive capacities" (Malloy et al., 2022, p. 12).

3.2.3 What do we know about the extent to which cities are including an equity lens in urban adaptation planning?

In a global assessment of adaptation planning in large cities, Araos et al. (2016) found that only 18% of municipalities reported adaptation planning. Most adaptation planning progress was observed in cities from North America, Europe, and Oceania. There are numerous data challenges and limitations when evaluating adaptation planning such as: reporting bias, relationship between wealth and adaptation planning, regional differences in governance structures and municipal responsibilities (Araos et al., 2016). In a subsequent article, Araos et al. (2022) conducted a systematic global review of social equity considerations in adaptation responses. The authors found that about 60% of the peer-reviewed articles mentioned social equity "by involving marginalized groups in planning or including them in implementation" (p.1461). It is important to note that high inclusion of social equity in adaptation planning is not synonymous to meaningful participation and influence in the decision-making and implementation processes. The integration of marginalized communities was relegated largely to low-income groups, with little

discussion about Indigenous people, elderly, youth, migrants, ethnic minorities, and disabled people (p. 1459). Equity and marginalized communities were largely mentioned in the sectors of poverty and livelihoods, ocean and coastal ecosystems, public health, food security, and access to clean water (p. 1459). Overall, the authors conclude that there are substantial research gaps in integrating equity and justice considerations in adaptation strategies and understanding whether the vulnerability of marginalized groups is reduced via adaptation responses.

Woodruff and Stults (2016) showcase through an empirical analysis of US local adaptation plans that most plans lack a strong implementation process and uncertainty analysis. Both gaps raise concerns on how plans are being utilized on the ground and how negative externalities and maladaptation are considered. Diezmatinez and Gianotti (2022) examine the integration of justice concerns into climate mitigation planning in large US cities. Employing a content analysis, the authors highlight 4 policy tools: justice partnerships, equity advisory boards, equity tools, and justice indicators being used to operationalize and implement climate policies (p. 5). However, the authors caveat that although the increasing acknowledgement of justice is positive, 42 of the 100 most populous US cities did not even have a local climate action strategy. Plans showcased a sectoral approach to addressing equity, which does not reflect the intersectional and compounding nature of climate vulnerability and there was a lack of "specific strategies to operationalise just climate policies on the ground" (p. 5). Meerow et al. (2019) explore social equity in resilience plans created by member cities of the 100 Resilient Cities program. Systematically reviewing 10 resilience plans, the authors found that when cities do have justice-oriented information, it is situated in addressing distributional equity through "equitable access to infrastructure, goods, services and opportunities" (p. 805). Few plans identified structural factors (such as systemic racism) while acknowledging the disproportionate impacts of climate change on the community. Likewise, Fiack et al. (2021) assessed 22 climate change adaptation plans created by large US cities for social equity concerns. They found that distributional justice concerns were framed as public health concerns with strategies aiming for improved environmental quality and economic growth. Essentially, the authors allude that there is little motivation to improve social equity for the sake of social equity, but social equity is rather a co-benefit of improved environmental quality and economic growth.

Guyadeen et al. (2019) analyze municipal climate change plans in Canada by pulling the 100 most populous municipalities in Canada and qualitatively categorizing climate change plans within the eight plan equality indicators. The authors found that climate change mitigation receives greater attention by policy makers rather than adaptation. In that study, the authors focus solely on plan quality and presentation, whereas my research goes beyond plan quality to question the relevance and effectiveness of the plans' policies in addressing inequalities that create differential social vulnerability to climate change impacts. The authors also conclude that implementation, monitoring, and evaluation are lackluster in the Canadian plans, which echoes similar findings in Woodruff and Stults' analysis of US plans (2016).

Centered in the intersection of municipal governance, climate adaptation planning, and equity, the aim of this research is to evaluate the following questions:

1) Do Canadian municipalities consider equity in relation to adaptation planning?
2) Are vulnerable and marginalized groups included in the adaptation planning process?

3) Are local adaptation plans likely to reduce vulnerability for marginalized groups?

3.3 Methodology

The research design of this study consisted of two stages: a content analysis of adaptation plans and a survey distributed to the municipalities in the study sample. Assessing the content of adaptation plans reveals municipal priorities with respect to the climate change impacts, policies, programs, and projects. I coded local adaptation plans to assess whether these documents recognize and address equity dimensions of local adaptation. I then distributed a survey to the sampled municipalities to gain insight into the planning processes that preceded plan adoption, particularly with respect to equity and inclusion, and staff perceptions about plan implementation.

3.3.1 Sampling strategy

The sample was selected using population data from the 2021 Canadian Census. There are no limitations on data analysis or storage. All the sampling and data sorting was performed using Excel.

I stratified the list of municipalities[2] into five groups by population size, and then randomly sampled from within each group to generate a sample. There are significantly more small municipalities than large ones in Canada, so a simple random sample would likely contain relatively few of Canada's major population centers. Stratified random sampling ensured municipal representation from all different population sizes. The first group is municipalities with over 1 million people, the second is municipalities between 999,999 and 500,000 people, the third group is municipalities with 499,999 to 100,000 people, the fourth group is 99,999 to 10,000 people, and the fifth group is municipalities with 9,999 to 5,000 people. I deemed it unlikely that municipalities with populations lower than 5000 people would have an adaptation plan due to scarcity of resources for creating climate action plans so these municipalities were excluded from the sampling frame.[3]

The desired sample size was calculated to a confidence interval of 0.1, using the Australian Bureau of Statistics online sample size calculator for random samples. I included all the cities within groups 1 and 2, as excluding any cities within this group would not accurately represent the quality of wide-reaching adaptation plans. With the help of the random sample size calculator, I was able to input the number of cities in group 3, 4, and 5 respectively to calculate the sample size: (35, 115, and 108 respectively). All in all, the sampling strategy returned 270 cities.[4] I searched all 270 municipal websites to identify five possible types of plans: adaptation strategies, comprehensive climate change strategies that include

[2] Statistics Canada defines a "census subdivision" as a general term for municipality, which is determined by the provincial/territorial government (or a municipal equivalent for statistical purposes)

[3] Statistics Canada has multiple definitions and abbreviations for different types of municipalities and some divisions are created for the sake of data management and are not reflective of real division of municipal authority. All these types of municipalities had less than 5000 people, so they were removed by the design constraints.

[4] A confidence interval of 0.05 would result in evaluating 500 municipalities, which I deemed unfeasible for the time limits of my research.

adaptation content (i.e. comprehensive climate action plans), and sustainability strategies, resilience strategies, or disaster management plans that contain an explicit focus on addressing impacts or risks of climate change. Any plans that did not have an explicit discussion about responding to climate change impacts or risks were excluded from analysis. Through this process, I identified 67 (24.8%) municipalities with an adaptation-relevant plan for the final inclusion.

In population group 1, there are 4 cities with plans. In population group 2, there are 6 cities with plans. In population group 3, there are 25 cities with plans. In population group 4, there are 22 cities with plans. Finally, in group 5, there are 9 cities with plans. Most of the plans seem to be coming from cities near the border, and near a larger metropolitan area. There is a large concentration of plans coming from the Lake Ontario and Saint Lawrence River areas, as well as the Greater Vancouver area. There is a noticeable lack of plans coming from the Prairies and Northern regions of Canada. It seems that even cities with plans also tend to be closer in proximity to larger urban centers, such as Montreal, Toronto, and Vancouver (Refer to Fig. 1 & 2 for a visual depiction of the sampled cities).

Figure 1: Regional distribution of sampled municipalities

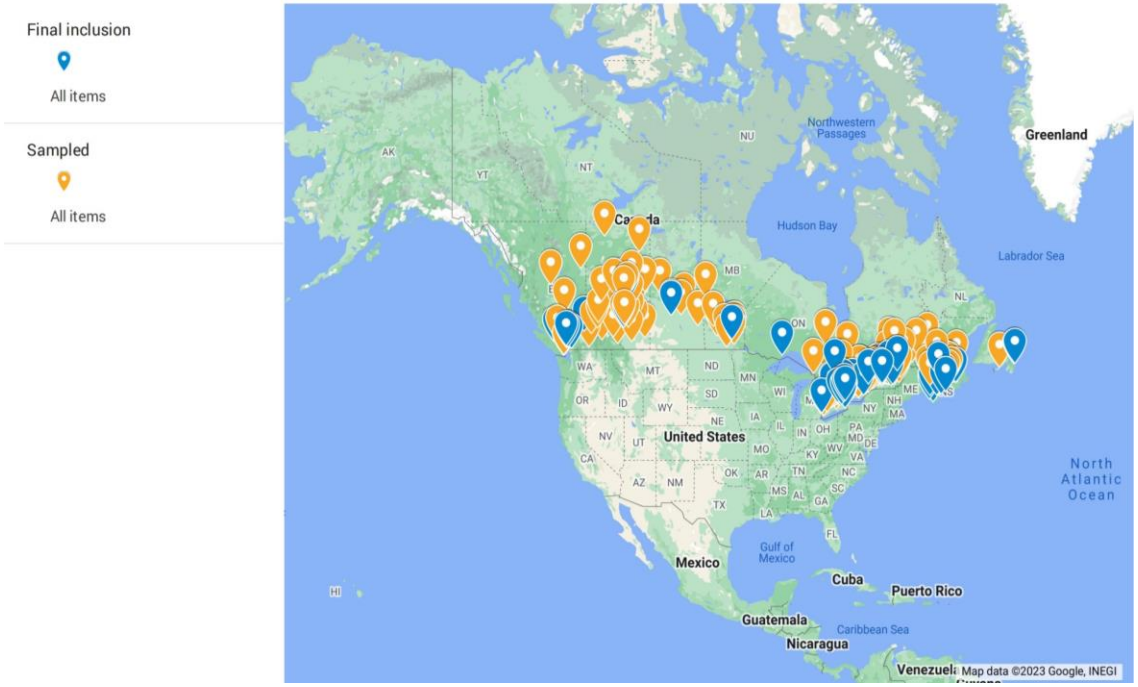
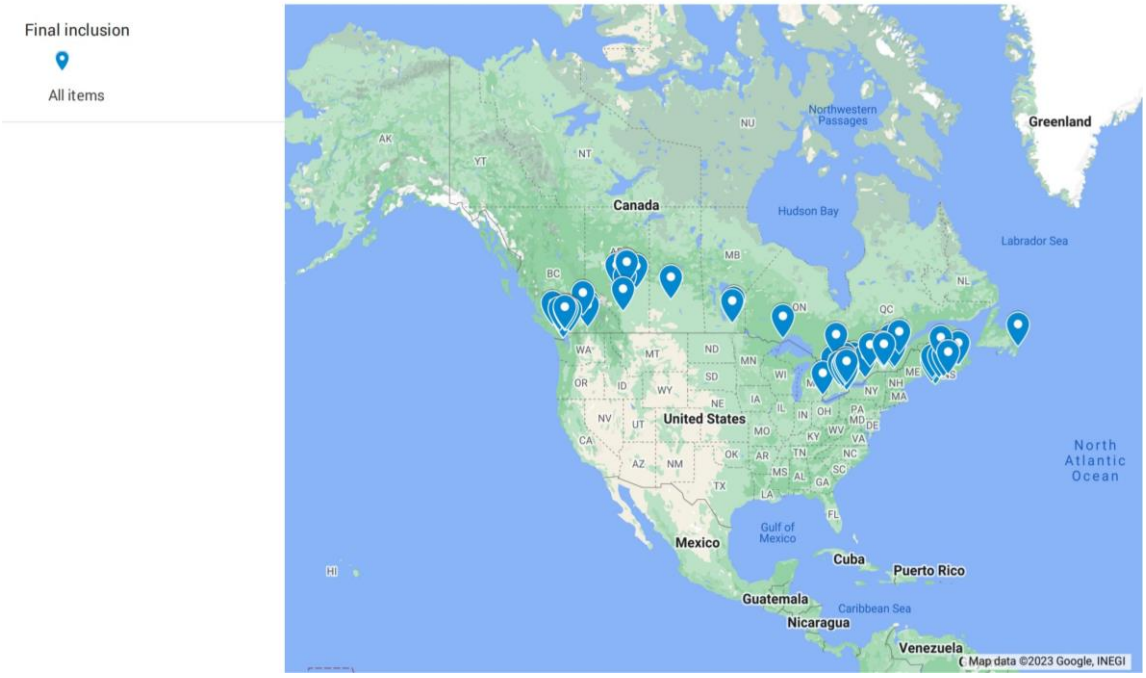


Figure 2: Regional distribution of cities with a climate change adaptation plan



3.3.2 Data Collection

Using Berke & Godschalk (2009), Lyles & Stevens (2014), Woodruff & Sults (2016), and Guyadeen et al. (2019) development of plan evaluation methodologies, I developed a coding protocol with nine indicators, which I evaluated primarily at the document level.

The first indicator is the factbase, which inquires whether the drivers and causes of climate change are mentioned in the plan, specifically looking for how inequalities and/or structural factors can drive climate vulnerability. The second indicator is goals, which asks whether the plan has specific adaptation related goals. The third indicator is implementation, which evaluates the plan regarding timelines, resource allocations, funding, and implementation-oriented details. The fourth indicator is monitoring and evaluation, which inquires whether the plan details any measurable objectives or names departments responsible for updating the plan given changing conditions. The fifth indicator is inter-organizational coordination, which asks whether the plan includes any horizontal/vertical connections as well as ties to community or civil society groups. The sixth indicator is participation, which asks the plan to identify any organizations and stakeholders (including the public) involved in the plan-making processes and how. The seventh indicator is organization and presentation, which asks whether the plan has a summary, table of contents, definitions, and other organizational qualities. The eighth indicator is equity, which asks whether equity is recognized in the plan, whether marginalized and vulnerable groups are included in the plan. The ninth indicator is uncertainty (Woodruff & Sults, 2016), which asks whether the plan is considering both climate scenario uncertainty as well as policy impact and implementation uncertainty. Please refer to Appendix A for the detailed coding protocol.

3.3.3 Document Analysis

To conduct the document analysis, I operationalized the coding protocol described in section 3.2.2. I used the coding document as my guide to assess the planning documents, highlighting and coding any passages that reflected the information. The content analysis produced 3,615 unique quotes across 67 plans. The document content analysis was performed using ATLAS.ti. I extrapolated the coded information from ATLAS.ti so that each planning document had a binary value (0 if the code is unsatisfied, and 1 if satisfied). After this categorization, I began the statistical analysis with ANOVA, analysis of variance, tests. ANOVA tests look at and compare all groups at once, representing the probability that the intra-correlation of all the groups is due to chance. In other words, the results from these tests compare multiple means at once for the whole set of comparisons. ANOVA tests help me understand "big-picture" patterns in my data, but neglect the comparison of specific groups. I therefore performed additional post-hoc analyses, which allows me to pit each group against each other in every combination. To correct for family-wise error rate in these tests, I used the Bonferroni correction which adjusts the confidence level (alpha) by dividing it by the number of possible combinations.[5]

3.3.4 Survey of sampled municipalities

Following the content analysis, I prepared a survey intended for municipal staff working on adaptation initiatives. The intention of the survey was to inquire about staff perspectives on how adaptation planning is actually conducted, what successes and obstacles staff encounter, and their professional opinions on community/civil society participation. Please refer to Appendix B a detailed list of questions. I applied and received ethics approval from Concordia University's Office of Research in May 2023.

3.4 Results

My primary research focus is on examining equity considerations within Canadian municipal adaptation plans. In my methodology, I consider equity as an indicator of plan quality. To assess these considerations, I initially investigate plan adoption and quality based on municipal population size, region, and consultancy. Following these assessments, I conduct a more in-depth analysis of equity aspects, such as distributional and procedural dimensions.

Out of the 67 plans that were analyzed, 62 (92.5%) of plans had information about adaptation actions, 51 (76.1%) had elements of organization and presentation, 48 (71.6%) had a factbase, 41 (61.2%) had goals, 38 (56.7%) included mentions of equity, 37 (55.2%) included mentions of participation and monitoring and evaluation respectively, 29 (43.3%) included implementation-oriented information, 23 (34.3%) included elements of interorganizational coordination, and finally, 13 (19.4%) included mentions of uncertainty.

[5] The number of combinations (k) is the sum of natural integers in descension from (n-1) so if there are 5 population bins: 4+3+2+1=10 combinations. With a confidence level of 0.1, the Bonferroni corrected alpha would be 0.01.

3.4.1 Population size, not provincial affiliation, is an important indicator of adaptation plan adoption

To begin this analysis, I sorted the dataset by municipal population and inclusion (1 = municipality had an adaptation plan, 0 = no plan). Using this matrix, I ran an ANOVA statistical analysis to determine whether the population size of the municipality impacted the likelihood of it having a climate change adaptation plan (Table 1.2). The ANOVA p-value of 4.01e-20 is statistically significant and incomprehensibly small compared to my confidence of 0.1. This indicates that the probability of a municipality containing an adaptation document is heavily correlated to its population size. Generally, the data shows that the larger the municipality, the more likely it is to have an adaptation plan. 100% of group 1 municipalities contained plans and in contrast, only 8.41% of group 5 municipalities had plans (Table 1.1).

SUMMARY

Groups	*Population size*	*Count*	*Sum*	*Average*	*Variance*
Bin 1	over 1 million	5	5	1	0
Bin 2	999,999 to 500,000	7	6	0.857142857	0.142857143
Bin 3	499,999 to 100,000	37	25	0.675675676	0.225225225
Bin 4	99,999 to 10,000	114	22	0.192982456	0.15711846
Bin 5	9,999 to 5,000	107	9	0.08411215	0.077764063

Table 1.1: Mean inclusion by population size group

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*Significant?*
Between Groups	15.41144649	4	3.852861622	29.20284888	4.01E-20	TRUE
Within Groups	34.96262758	265	0.131934444			
Total	50.37407407	269				

Table 1.2: ANOVA statistical test for variance between population size group

I also examined the regional distribution of municipalities with climate adaptation plans across Canada. Statistically significant results from the ANOVA analysis indicated meaningful variation in levels of plan adoption between provinces ($p = 0.03$). (Table 3.2). However, the post-hoc analysis showed that the only truly significant variance existed between Nova Scotia and Quebec, when corrected with the Bonferroni confidence. In other words, when analyzing the combinatorial relationship between all respective provinces, the difference in the percentage of plan adoption between Nova Scotia and Quebec was the most statistically notable. Conceptually, this variance illustrates that Nova Scotia's 53% municipal inclusion rate is superior to Quebec's 15.15%. Considering the sample size of Quebec's municipalities (n=66), the inclusion rate of 15.15% is disproportionately lower than other provinces. (Table 3.1).

SUMMARY

Groups	Count	Sum	Average	Variance
AB	31	6	0.193548387	0.161290323
BC	41	15	0.365853659	0.237804878
MB	12	2	0.166666667	0.151515152
NB	5	0	0	0
NL	3	1	0.333333333	0.333333333
NS	15	8	0.533333333	0.266666667
ON	85	24	0.282352941	0.205042017
PEI	4	0	0	0
QC	66	10	0.151515152	0.130536131
SK	8	1	0.125	0.125

Table 3.1: Mean inclusion by province

ANOVA

Source of Variation	SS	df	MS	F	P-value	Significant?
Between Groups	3.373124711	9	0.374791635	2.073273547	0.032267341	TRUE
Within Groups	47.00094936	260	0.180772882			
Total	50.37407407	269				

Table 3.2: ANOVA statistical test of variance between provinces

From here, I conducted a multivariate (also referred to as stacked) analysis that compared municipalities with plans by provinces subcategorized by the municipal population size. This analysis examines regional variation for plan adoption within population groups. In other words, the purpose of the multivariate analysis is to assess which is the stronger driver, provincial policies (regional affiliation) or population size. Due to the random stratified sampling strategy and the general population distribution in Canada, some provinces did not have any municipalities in groups 1, 2, and 3. As expected, all municipalities in group 1 had an adaptation plan regardless of province. In group 2, all 6 municipalities had adaptation plans, indicating no notable variance between the provinces. Thus, I only performed a stacked analysis of provincial inclusion in groups 4 and 5 respectively, holding them constant to compare provincial influence.

I ran a comparative test between all the other provinces in group 4, with the exception of N.L., which only had 1 municipality. The ANOVA test yielded a p-value of 0.0493, indicating a statistically significant variance between all 9 provinces generally (Table 6.11). However, the post-hoc tests revealed no significant variances between any of the provinces when adjusted for family-wise error rate. With the exception of Nova Scotia (42.85% adoption) and B.C. (50% adoption), all the municipalities in group 4 had low adoption rates, ranging between 0-15% (Table 6.10). A similar pattern emerges in group 5, with the only province containing more than 13% adoption rate being Nova Scotia at 57.14%. (Table 6.13). Naturally, this is reflected in the p-value at 0.0016, which indicates patterns of high variance in the data (Table 6.14). This multivariate analysis corresponds with the earlier findings from the plan adoption analysis, indicating that population size is a stronger driver of

municipalities having an adaptation plan than provincial affiliation. When controlling for each population group and assessing plan adoption, I observe minimal regional differences, except for Nova Scotia, for which the reasons will be explored in section 3.5.

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
AB	13	1	0.076923077	0.076923077
BC	16	8	0.5	0.266666667
MB	7	1	0.142857143	0.142857143
NB	3	0	0	0
NL	1	0	0	#DIV/0!
NS	7	3	0.428571429	0.285714286
ON	32	5	0.15625	0.13608871
PEI	3	0	0	0
QC	29	4	0.137931034	0.123152709
SK	3	0	0	0

Table 6.10: Within group 4, average plan adoption by province

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*Significant?*
Between Groups	2.592854608	9	0.288094956	1.976177391	0.049359169	TRUE
Within Groups	15.16153136	104	0.145783955			
Total	17.75438596	113				

Table 6.11: Within group 4, ANOVA statistical test of plan adoption between provinces

BIN 5

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
AB	15	2	0.133333333	0.123809524
BC	18	1	0.055555556	0.055555556
MB	4	0	0	0
NB	2	0	0	0
NL	1	0	0	#DIV/0!
NS	7	4	0.571428571	0.285714286
ON	28	1	0.035714286	0.035714286
PEI	1	0	0	#DIV/0!
QC	28	1	0.035714286	0.035714286
SK	3	0	0	0

Table 6.13: Withing group 5, average plan adoption by province

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*Significant?*
Between Groups	1.922355734	9	0.213595082	3.277949631	0.00159293	TRUE
Within Groups	6.320634921	97	0.065161185			
Total	8.242990654	106				

Table 6.14: Within group 5, ANOVA statistical test of plan adoption between provinces

3.4.2 Regional affiliation, not population, is associated with variations in plan quality

Next I analyzed whether population or regional location are correlated to plan quality. Overall, there does not seem to be significant variation between population groups with respect to plan quality. The only statistically significant relationship was observed around indicators of uncertainty (p = 0.04) (Table 2.29). Municipalities in the small population group, group 5, tended to discuss climatic uncertainties at higher rates than municipalities in other groups (55%). In contrast, in the second largest population group, none of the municipalities had plans containing information about climatic uncertainty. Municipalities performed similarly in the remaining population groups, with 10-20% of plans containing information about uncertainty[6] (Table 2.28). These findings lead me to conclude that while population size is an important indicator of whether a municipality is likely to have an adaptation plan, it is not associated with plan quality.

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Bin 1	5	1	0.2	0.2
Bin 2	6	0	0	0
Bin 3	24	5	0.208333333	0.172101449
Bin 4	20	2	0.1	0.094736842
Bin 5	9	5	0.555555556	0.277777778

Table 2.28: Mentions of uncertainty by population group size

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*Significant*
Between Groups	1.578819444	4	0.394704861	2.652176922	0.04184093	TRUE
Within Groups	8.780555556	59	0.148822976			
Total	10.359375	63				

Table 2.29: ANOVA statistical test of mentions of uncertainty within population group size

[6] Uncertainty was most prominently discussed in terms of the future of the climate more so than in terms of policy impact or implementation. Please refer to Appendix C in supplementary materials for the full list of quotations coded for uncertainty.

The regional analysis of plan quality yielded larger statistical differences. ANOVA tests of the regional dataset within each code resulted in significant results for monitoring and evaluation, participation, and organization/presentation (Table 7). Notably, all the regions performed similarly in goals, equity, and adaptation actions. The ANOVA test for regional location and monitoring and evaluation was significant at p = 0.0241 (Table 4.11). The strongest regional performance here is among municipalities in Ontario. 80.95% of municipalities sampled from Ontario included monitoring and evaluation sections in their plans. The weakest performance was among municipalities in Nova Scotia, where only 12.5% (1 out of 8 plans) contained monitoring and evaluation sections (4.10).

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Alberta	6	3	0.5	0.3
British Colombia	15	10	0.666666667	0.238095238
Manitoba	2	1	0.5	0.5
Newfoundland	1	0	0	0
Nova Scotia	8	1	0.125	0.125
Ontario	21	17	0.80952381	0.161904762
Quebec	10	4	0.4	0.266666667
Sasketchewan	1	1	1	0

Table 4.10: Mentions of monitoring and evaluation by province

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*Significant*
Between Groups	3.762946429	7	0.537563776	2.541151643	0.024110238	TRUE
Within Groups	11.84642857	56	0.211543367			
Total	15.609375	63				

Table 4.11: ANOVA statistical test on mentions of monitoring and evaluation between provinces

Comparative group	Factbase	Goals	Implementation	Monitoring and Evaluation	Interorganizational Coordination	Participation	Organization and Presentation	Equity	Adaptation Actions	Uncertainty
Population bins	0.232450084	0.375445182	0.148545472	0.160151136	0.586777132	0.160151136	0.2108646	0.543859329	0.212973754	0.04184093
Regional differences	0.2364656	0.102896384	0.210924404	0.024110238	0.191428062	0.021924116	0.027392697	0.796375972	0.780419981	0.320799164
Plan consultancy	0.837502158	0.382959172	0.94524845	0.74305638	0.640757634	0.888067304	0.269322581	0.862310296	0.376752708	0.656384983

Table 7: X summary of ANOVA p values by plan quality indicators for population groups, provinces, and consultancy

There was a large difference between the regions in plan participation (p = 0.02) (Table 4.17). This large variance between all the regions is specifically due to Quebec's poor performance. Only 10% of municipalities from Quebec had information about plan participation compared to Nova Scotia's 75%, B.C.'s 7%, and Ontario and Alberta's 66%, respectively (Table 4.16). The ANOVA test for organization/presentation also shows a large and statistically significant difference between provinces (p = 0.03) (Table 4.20). In nearly every province every plan

received high marks for organization and presentation, except B.C. (60%) and Quebec (50%) (Table 4.19).

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Alberta	6	4	0.666666667	0.266666667
British Colombia	15	11	0.733333333	0.20952381
Manitoba	2	2	1	0
Newfoundland	1	1	1	0
Nova Scotia	8	6	0.75	0.214285714
Ontario	21	14	0.666666667	0.233333333
Quebec	10	1	0.1	0.1
Sasketchewan	1	1	1	0

Table 4.16: Mentions of participation by province

ANOVA

Source of Variation	SS	df	MS	F	P-value	Significant
Between Groups	3.666666667	7	0.523809524	2.588235294	0.021924116	TRUE
Within Groups	11.33333333	56	0.202380952			
Total	15	63				

Table 4.17: ANOVA statistical test on mentions of participation between provinces

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Alberta	6	6	1	0
British Colombia	15	9	0.6	0.257142857
Manitoba	2	2	1	0
Newfoundland	1	1	1	0
Nova Scotia	8	8	1	0
Ontario	21	19	0.904761905	0.09047619
Quebec	10	5	0.5	0.277777778
Sasketchewan	1	1	1	0

Table 4.19: Mentions of organization and presentation by provinces

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*Significant*
Between Groups	2.44985119	7	0.349978741	2.477874774	0.027392697	TRUE
Within Groups	7.90952381	56	0.141241497			
Total	10.359375	63				

Table 4.20: ANOVA statistical test on mentions of organization and presentation between provinces

I further analyzed whether municipalities are relying on external consultancies for assistance in completing their plans, including the relationship between consultancy use and plan quality. Overall, I identified 14 unique consulting agencies referenced in plan documents, primarily from Quebec (50%), Nova Scotia (38%), Ontario (29%), and B.C. (13%). There are notable differences in the use of consultancies across population groups. Plans belonging to municipalities in population groups 1 and 2 did not mention any consultant involvement, while 24% of the plans in group 3 involved consultancies, 50% of the plans in group 4 involved consultancies, and 56% of the plans in group 5 involved consultancies. I do not observe any relationship between the use of consultancies and the 9 dimensions of plan quality I coded for (Table 7). The only measure of plan quality where consultancy may have made a slight difference is in organization and presentation ($p = 0.27$), although statistically insignificant, this may be worth exploring in future research.

3.4.3 Equity dimensions of municipal adaptation plans

Neither population size nor regional affiliation influences the adoption of an equity lens in adaptation plans

As previously mentioned, only 38 out of the 67 plans (56.7%) included mentions of equity. Neither population size nor regional location were associated with attention to different dimensions of equity in municipal adaptation plans. Regardless of municipal population size, all the groups averaged between 45-78% inclusion of equity considerations (Table 2.22). Similarly, all the provinces (excluding N.L. and Saskatchewan because they only had 1 plan each) averaged between 40-75% inclusion of equity considerations. (Table 4.22). In the ANOVA statistical tests of both population size and the regional affiliations, the p value showed that there is no statistically significant variance of the inclusion of equity through these groupings (Table 7). The average prevalence of 45-78% is relatively high across the board, indicating that the majority of Canadian municipalities are aware about equity and attempt to address it, albeit in a limited fashion.

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Bin 1	5	3	60.00%	0.3
Bin 2	6	4	66.67%	0.266666667
Bin 3	24	15	62.50%	0.244565217
Bin 4	20	9	45.00%	0.260526316
Bin 5	9	7	77.78%	0.194444444

Table 2.22: Mentions of equity by population group size

SUMMARY				
Groups	*Count*	*Sum*	*Average*	*Variance*
Alberta	6	3	0.5	0.3
British Colombia	15	9	0.6	0.257142857
Manitoba	2	1	0.5	0.5
Newfoundland	1	1	1	0
Nova Scotia	8	6	0.75	0.214285714
Ontario	21	13	0.619047619	0.247619048
Quebec	10	4	0.4	0.266666667
Sasketchewan	1	1	1	0

Table 4.22: Mentions of equity by province

Little to no insights regarding vulnerability reduction for marginalized communities in adaptation plans

To dive deeper into the context and content of the equity considerations, I created a code co-occurrence matrix of my equity centered results. I created this to understand the context in which the planning documents referenced distributional and procedural equity. Only 138 quotations or 3.8% were coded with general mentions of equity. Of those quotations, 115 or 3.2% addressed distributional equity, and only 23 or 0.6% of total quotations mentioned procedural equity. The co-occurrence of these two equities was found 5 times.

Within quotations of distributional equity, 58 mentions or 50% were in the context of establishing a fact base: The planning documents reiterate how climate change impacts are disproportionate and affect vulnerable and marginalized communities more, but little is said about the socio-economic drivers of vulnerability that may be exacerbated by local climate hazards. Aside from generic statements on unequal impacts of climate change, the documents primarily discussed equity in terms of vulnerability to flood risk and heat-related health risks (20 quotations). Mobility, land-use planning (green development), and labor was discussed only minorly. Please refer to Appendix C for detailed quotations.

The next largest mentions, with 39 quotations or 35.6%, were in the context of an adaptation action. Within adaptation actions the planning documents discussed equity in the context of land use and planning (including housing) (6 quotes), public health (heat-related risks) (10 quotes), emergency response (6 quotes), and public outreach (10 quotes). My findings here echo those by Meerow et al. (2019), Fiack et al. (2021), who found that when cities in the US focus on justice issues within climate adaptation, it is centered around accessibility (to infrastructure and services) and public health (exposure to flood events and extreme heat). None of the documents in this study "call for radical transformation of the capitalist system or degrowth" (Meerow et al., 2019, p. 805). Land use and planning is centered around encouraging active transportation (Yarmouth), creating public parks (Burnaby), and adapting housing stock (Montreal and Saint Lambert). Strategies related to emergency response ranged from developing a "vulnerability registry" (Yarmouth) to creating critical support centers such as cooling/heating facilities (Cambridge). Toronto's plan utilized an online Equity Lens informational tool, which helped with staff training as well as building relationships between Indigenous and non-Indigenous peoples in Canada. Please refer to Appendix C for detailed quotations.

Seven mentions, or 6%, are affiliated with goals, 4 mentions, or 3.5%, are affiliated with local climate hazards and participation respectively, 2 mentions, or 1.8%, in implementation and interorganizational coordination respectively, and 1 mention, or 0.9%, in informational tools. To summarize, the results highlight that distributional equity is primarily discussed in the context of factbase and adaptation actions and is largely neglected when it comes to implementation. Mentions and discussion of equity are piecemeal with key concerns left unaddressed, such as discussions revolving around uncertainty and maladaptation. Given these results, it is unlikely that adaptation plans can reduce vulnerability for marginalized communities because these documents are more reflective of a fact-stating mission rather than outlining strategies to target structural inequalities. Even when equity is operationalized into adaptation actions, it does not sufficiently address root causes of differential vulnerability, as will be explored further in section 4.

Participation of vulnerable and marginalized communities in planning process is weak across all municipalities.

Procedural equity is mentioned mostly in the context of participation, as expected. Of the 23 total quotations of procedural equity, 16 (70%) happened in the context of participation, 8 (35%) mentions within adaptation actions, 2 (8.6%) within factbase, and once within goals, interorganizational coordination, and local climate hazards, respectively.

Participation in these plans is characterized by the development of community advisory committees (Winnipeg) as well as involvement from youth and student groups (Halton Hills) and Indigenous peoples (Winnipeg, Saskatoon, Halifax, Greater Sudbury, and Kitchner). In terms of adaptation actions, procedural equity is discussed in terms of public engagement to understand community needs (Saskatoon, Salt Spring Island, Cape Breton, and Calgary) as well as developing governance committees to guide resource sharing arrangements (Nanaimo). Appendix C provides detailed quotations regarding procedural equity. With only 0.6% of all quotations featuring procedural equity, it is obvious that stakeholder engagement and public participation continues to be a struggle for local government.

3.4.4 Results from surveying municipal staff on the adaptation planning process

To gather further insights into adaptation planning, I developed and administered a survey from August to December 2023, as described in section 3.3.4. The survey was deployed to 71 municipalities, initially included in the document collection. The questionnaire consists of a maximum of 23 questions and takes approximately 25 minutes on average to complete. Please refer to Appendix B for the complete list of questions. The survey was administered via Google Forms due to its user friendly and ubiquitous nature as well as its limitless cap on the number of responses. I received 4 responses to the survey and 7 emails discussing why the survey cannot be completed. Some city staff responded to the survey via email to discuss why they could not complete the survey, such as the adaptation plan being incorporated into other strategies, the plan still being the development phase, the adaptation pioneering staff no longer available, or the city is focused on corporate climate change mitigation, rather than community resilience building. Of the responses, 3 respondents (75%) considered climate change a local political issue of significance. Only 2 respondents (50%) said that climate justice or equity was specifically considered within the planning process. One respondent stated that

“Some people resisted the relevance of Indigenous Reconciliation in climate action activities.” The survey included questions about civil society and private sector participation in the development of adaptation plans. Involving and having meaningful engagement with stakeholders was noted as a general challenge. A respondent stated that “due to costs and logistical challenges such as scheduling around engagement it was difficult to engage with all the different groups meaningfully. Additionally, it was challenging to do long-term strategic planning with some organizations that were dealing with much more pressing and immediate challenges.” On the other hand, this respondent noted that private sector groups expressed “some resistance to share information around assets and services of private industry, due to concerns around proprietary information. Additionally, there were challenges around talking about impacts that require actions that impose a cost on the private sector.” On a more administrative note, another respondent notes that “some were only able to attend a small fraction of the meetings.”

In summary, the survey results indicate a mixed landscape where awareness of equity considerations in adaptation planning exists, but operationalizing these concepts faces challenges related to engagement, resource constraints, and different priorities among stakeholders. While climate change is recognized politically, equity considerations may not be fully integrated into adaptation planning. A more critical interpretation suggests the possibility that equity considerations may be mentioned superficially, perhaps for appearances, without genuine commitment or intention to operationalizing them.

3.5 Discussion

This section aims to flesh out and add context to the statistical and survey results by analyzing provincial policies and the context in which they may have emerged. This discussion will intertwine survey findings with details from the planning documents, revealing that, although equity considerations are acknowledged, they often remain superficial with limited participation and efficacy in reducing vulnerability.

3.5.1 Population size as a primary driver of plan adoption, except Nova Scotia

The conclusions from the population analysis show that population size is a factor that affects the likelihood of a municipality having an adaptation plan. This could be for several reasons such as: larger municipalities having more resources, financially and in terms of labor. However, since plan quality is similar amongst municipalities regardless of population size, it seems that the resources in larger cities do not go further compared to smaller cities. On a more positive note, this is a powerful message because this displays that medium to small municipalities do not necessarily need the resources of giants such as Toronto or Montreal to facilitate adaptation, at least in terms of planning. Perhaps the similarities in plan quality can be attributed to similar frameworks that municipalities are using such as the Canadian Institute of Planners’ “Climate Adaptation Handbook for Small Towns and Cities,” ICLEI’s “Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation,” and/or resources from Canada’s Library of Climate Resources.

The regional analysis showcased that provincial affiliation did not affect the likelihood of the municipality having an adaptation plan, with the glaring exception of Nova Scotia. This is because Nova Scotia funded in part the Climate Adaptation Leadership Program, helping develop climate adaptation strategies from 2019 to

2022. Above all, the Environmental Goals and Climate Change Reduction Act of 2021 requires climate adaptation planning across every government department. The impact of this mandate is clearly seen through the inclusion rate of municipalities in Nova Scotia, especially in group 5. These policy instruments are representative of the policy style public provision and oversight. There is a display of high government capacity through the ability to pass the Environmental Goals Act and the ability of the municipalities to follow through in their reporting. However, municipalities in Nova Scotia struggled significantly more than others in terms of having information related to monitoring and evaluation. The exercise of top-down authority through these types of mandate is directly correlated with the local adaptation plan development through public provision and oversight, showcasing that decision-makers have a perception of urgency. Furthermore, the case of Nova Scotia may indicate that "local resource constraints are not necessarily an impediment to substantive policy adoption" but local dependence on hierarchical policy development could be a deterrent in policy uptake (Lesnikowski, 2021). Overall, the results under the context of Nova Scotia's climate planning circumstances showcase a positive association for plan creation through public provisioning, but no discernable trend in terms of plan quality.

3.5.2 Provincial affiliation is a key indicator of plan quality: Exploring potential path dependency in Quebec

Provincial affiliation is a stronger determinant of plan quality than population size in Quebec, with the exception of discussing uncertainty. Small municipalities performed significantly well in discussing uncertainty compared to more populous cities (Table 6 in supplementary materials). In general, the plans discuss uncertainty in terms of climate unpredictability, pathway dependency, and building financial support for unanticipated impacts of climate change. Uncertainty is not discussed in terms adaptation implementation, monitoring and evaluation, and potential maladaptive impacts. Notably, all the regions performed similarly for the rest of the indicators, including equity. Indicators such as monitoring and evaluation, participation, organization/presentation had very high differences between the regions. The strongest regional performance for these three indicators was Ontario.

On the other hand, municipalities from Quebec performed poorly in terms of plan quality across factbase, participation, organization/presentation, and uncertainty. Quebec has a long history of sustainable development policy, with the adoption of the Sustainable Development Act in 2006, which ordered the development of sustainable development plans for government agencies and public organizations. This does not correspond to having a high municipal plan adoption rate for Quebec because these sustainable development plans did not contain any explicit information on climate change adaptation strategies: When I scoped the content of these plans in the preliminary stages of research, I observed that these plans are largely focused on maintaining economic growth while integrating environmental principles into other sectors such as tourism, energy, agriculture, etc. This type of governance model is a mix of holistic and policy principles, characterized by a superficial quality to the plans (Happaerts, 2012, p. 562).

Bourgeois' doctoral thesis (2022) explored climate change adaptation in Quebec municipalities in depth and discovered that the challenges faced by larger cities in Quebec differ from those of smaller cities (p. 141). The availability and accessibility of provincial funding through *Climat municipalite* was a significantly important consideration for smaller municipalities to develop adaptation plans.

Furthermore, Bourgeois outlines how the multi-level administrative structure of Montreal forces the city to take a more incremental approach to climate policy planning and implementation (p. 147). Plus, Montreal, Laval, and Sherbrooke were detailing measures already taken by different administrative units rather than presenting new strategies (p.146), further supporting Happaerts previous findings of the cosmetic nature of Quebec policy instruments (p. 568). Perhaps the differences between Quebec and the other regions can be further explored by assessing policy agenda setting scenarios. Future research could focus on Quebec as a case study of climate policy path dependency in conjunction with the economization of vulnerability (Friedman, 2023) to explore compounding risk, maladaptation, and the social cost of economic growth.

3.5.3 Consultancy offers little to no improvement in municipal plan quality

Consultancy did not make any noticeable impact in plan quality. Furthermore, Quebec and Nova Scotia have the highest rates of consultancy involvement compared to other regions. Of all the consulting agencies, Pinna Consulting, CBCL Limited, Genivar, and SNC-Lavalin (AtkinsRealis) were all mentioned twice respectively. As previously explored, path dependency and the history of climate legislation may explain why these 2 regions have higher rates of consultancy. Nova Scotia's mandates may push municipalities to complete their climate inclusive planning "out of house" to meet deadlines while tackling capacity constraints. Quebec's sustainable development agenda may have resulted in more engineering-oriented consulting as observed. Previously, scholars like Woodruff and Regan (2019) have observed that national adaptation plans authored within the government were of higher quality than plans authored by consultants, although the reasons are not explained. There is still a relatively large research gap in assessing the impact and efficacy of consultancy in the development of local climate action plans, especially from a Canadian perspective.

3.5.4 Survey insights in adaptation planning from a critical equity lens

The results and analysis from the previous sections highlight that although municipalities are increasingly aware and considerate of equity in adaptation planning, there is a significant stall operationalizing these concepts.

The language in the planning documents is aspirational and generic when it came to the adaptation actions, especially when it came to participation of civil society groups, stakeholders and general public participation. For example, Yarmouth's "Climate Change Action Plan" states: "However, there needs to be better coordination between vulnerable groups and EMO to help minimize the adverse affects of climate change impacts," but lacks specific details on the implementation. Similarly, Toronto's "Resilience Strategy" acknowledges low civic participation among vulnerable community members but provides limited insight into strategies for increasing engagement: "And we know that vulnerable residents are much less likely to participate in civic processes or see themselves reflected by government. While Toronto is already making exciting strides towards resilient neighbourhoods and infrastructure, more can be done towards realizing resilience across the city." The prevalence of vague language in planning, as noted by Kingsborough et al. (2016) and discussed by Cottrell (2023), can offer flexibility to the dynamicity of climate change. However, specific language is important for grant applications, implementing climate projects, effective monitoring and evaluation, and establishing reasonable timeframes (Cottrell, 2023). Regarding the inclusion of vulnerable groups

in adaptation planning, the observed language tends to be aspirational, with a lack of specific details on strategies and actions. Planners have cited scheduling difficulties, expressing challenges in facilitating meaningful discussions. This indicates substantial room for improvement in participation.

The results and survey responses strongly suggest that local adaptation plans face considerable challenges in effectively reducing vulnerability for marginalized groups. When asked about challenges, one respondent pointed out “There were challenges more around interpreting and translating the data and information, so that stakeholders could identify what that data and information meant for them. There was *[sic]* also challenges in accessing academic, peer reviewed scientific literature (due to access fees that the municipality could not pay).” All the respondents agreed that there is not sufficient funding available in the municipal budget to implement adaptation and that they must secure additional funding in the future for the completion of proposals within the adaptation plan. A respondent observed that “There are always competing priorities for small municipalities *[sic]* limited budget and limits on availability of staff to oversee projects.” There are quite a few constraints hindering municipalities from partaking in the survey and more importantly, completing adaptation projects. As noted in the literature review section and corroborated by the surveyed staff, capacity constraints in terms of human and financial resources, technology, and competing priorities make implementing adaptation strategies difficult. Similarly, Fila et al. (2023) note that “fragmented power structures across scales and unclear assignment of legal responsibilities to local governments impede effective context-based adaptation planning, especially for SMM (small- and medium-sized municipalities) with limited capacities” (p. 12). The authors continue on to discuss the difficulties of participatory processes at the local level, describing how adaptation is dependent on voluntary actions due to lower institutional capacity. Lack of strong, consistent leadership is another constraint municipalities are facing, potentially leading to the creation of adaptation plans as a box-checking exercise rather than substantive policy making. This disconnect between policy development and execution can result in a gap between stated intentions and tangible actions, further exacerbating the vulnerability of marginalized communities because it creates a deceptive impression of progress, masking the lack of substantive actions. In essence, the difficulties in participatory processes at the local level, coupled with the reliance on voluntary actions due to institutional limitations, create a fertile ground for the emergence of adaptation plans as mere checkboxes.

3.6 Conclusion

Overall, this study sought to examine the extent to which Canadian municipalities consider equity in their adaptation plans and planning processes. The findings indicate that while there is acknowledgement of equity within the documents, these considerations often serve a symbolic purpose and are primarily located in the fact-setting agenda. Vulnerable and marginalized groups are nominally included in the planning process, but their representation is notably limited in the plans. Furthermore, assessing the effectiveness of local adaptation plans in reducing vulnerability for these groups is likely impossible due to the lack of implementation detail in many plans, which suggests that many of them have not yet led to tangible changes. The deficiency in monitoring and evaluation data further complicates the ability to draw concrete conclusions regarding the impact of these plans on marginalized communities. As Canadian municipalities continue to address

the complex and evolving challenges posed by climate change, there is a pressing need to move beyond symbolic gestures and actively prioritize equity considerations in adaptation planning to ensure the resilience and well being of all community members.

Chapter 4: Conclusion

From the multilevel governance scholarship on adaptation, it is clear that all levels of government are critical in addressing adaptation and equity. At the national level, policies and initiatives have a broader scope, such as national infrastructure, regulations, and funding mechanisms (Government of Canada, 2022). On the other hand, municipal governments have a better understanding of local conditions and needs, and are well-positioned to implement context-specific adaptation measures. Within Canada, social safety nets are largely centralized and federal, but municipalities can still play a significant role in addressing structural and social drivers of vulnerabilities. Unfortunately, adaptation approaches so far have only been addressing vulnerabilities of marginalized communities in a fragmented manner, even though equity and justice are presented as an encompassing goal (Amorim-Maia et al., 2022). There is growing evidence that adaptation projects are overlooking equity, leading to deteriorating vulnerabilities for marginalized groups and "causing unjust and maladaptive externalities- even when pursued under the intent of justice" (Amorim-Maia et al., 2022, p.4). Strong, consistent leadership is crucial to the adaptation process, and its absence can be a significant barrier to resilience building (Shi et al. 2015; Rogers, 2022; Anguelovski & Carmin, 2011). The current level of political will may not be adequate to facilitate transformative adaptation, especially if political commitments are exclusively tied to economic growth (Lee, 2016).

In "Sustaining the Unsustainable", Bluhdorn (2007) explores simulative politics as a key strategy of late-modern societies to sustain what is known to be unsustainable. Symbolic politics involve the creation of policies and actions that serve as symbolic gestures, giving the appearance of addressing pressing concerns without challenging the status quo (Bluhdorn, 2007). He connects this concept to simulative policy, which involves the use of simulations and models to manage complex issues, resulting in a disconnect between appearance and reality. He argues that this interaction between symbolic policy-making and simulative politics creates the illusion of sustainability without addressing unsustainable practices (Bluhdorn, 2007). This dynamic creates the paradox where political action appears genuine, but continues to perpetuate inequalities. This article provides a critical lens through which we can analyze the potential challenges of symbolic policy-making and simulative strategies within the adaptation economy (Friedman, 2023). It underscores the importance of scrutinizing the true impact and effectiveness of policies to ensure that efforts to address climate change are substantive to build climate resilience. In the context of adaptation plans, the question of whether they are box-checking exercises implies a concern that these plans may be created to meet a formal obligation or responsibility, with little concern in addressing underlying vulnerabilities.

One could argue that the adaptation economy, as discussed by Friedman (2023) can be seen as a result or evolution of symbolic policy-making, as described by Bluhdorn (2007). The focus on financial motivations and the creation of new economic models that profit from climate risk could be seen as symbolic actions that give the appearance of addressing climate change, while failing to address the underlying sources of climate vulnerability. This could perpetuate inequalities especially if vulnerable communities are not actively involved in substantive decision-making processes. In such cases, adaptation measures may fail to address the unique challenges of these communities, resulting in disproportionate impacts. Box-checking exercises can create a false sense of security, giving the impression

that meaningful action is being taken when, in reality, it may be insufficient. This can delay the implementation of effective strategies, particularly in addressing socio-economic drivers of vulnerability. Furthermore, in Canada's multi-level governance structure, power dynamics within and between different levels of government can influence the development of adaptation policies (Di Gregorio et al., 2019). For example, more powerful actors may promote symbolic policies that align with their interest (such as economic growth), while marginalizing the concerns and needs of others, reproducing and reinforcing existing inequities (Di Gregorio et al., 2019). Moreover, the fragmentation of responsibility (Fila et al., 2023) may facilitate the adoption and persistence of symbolic policies. Governments can engage in "blame avoidance," asserting that other levels bear greater responsibility for adaptation due to the lack of clarity delineating roles and responsibilities among various actors in the governance system. Notably, scholars like Bache et al. (2014) have uncovered a significant "governance vacuum," where accountability is shifted as a "political self-preservation mechanism" (p.71). However, there remains a dearth of research exploring the "blame game" in the context of adaptation, particularly within the Canadian multi-level governance structure. Future research efforts could prioritize investigating this aspect.

The emergence or growth of adaptation plans as box-checking exercises can have implications for the overall effectiveness of equitable climate change efforts. There is a risk that adaptation efforts may prioritize superficial compliance or economic growth over transformative changes needed to address social drivers of vulnerability. If policies are primarily symbolic and lack substance, resources may be misallocated, directing investments toward initiatives that appear effective but do not contribute significantly to building resilience or addressing the needs of vulnerable communities. Furthermore, the negative impact of symbolic policy-making on political culture, as highlighted by Bluhdorn (2007), "undermines trust in democratic institutions, suffocates rational deliberation, and breeds disengagement and apathy" (p. 258). As we move towards a future of greater climate uncertainty, fostering trust and community becomes crucial. Achieving transformative adaptation requires time, emphasizing the importance of overcoming capacity and leadership constraints. For Canada to advance meaningfully in adaptation and climate justice, there needs to be greater genuine political commitment and local leadership, greater vertical and horizontal policy alignment (policy-making for transformative adaptation rather than for compliance), and more action-oriented approaches.

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Appendix A: Coding Protocol

Indicator Tier 1 Document Level	**Description and Guiding Questions**	Sources
Municipal Name	Census Subdivision name (CSD)	Lesnikowski (2021) - Coding Protocol
Sub-National Region	Province	
Document Title "Item Name"	As named by CSD	
Year of Adoption	Year plan was published	
Fact Base	Does the plan include a description of the causes of climate change? Does the plan include an emissions inventory, such as greenhouse gasses (GHG) and hydrofluorocarbons (HFCs)? Does the plan include capitalism and systematic oppression as drivers of climate change? Does the plan include a land acknowledgement or a historical fact base? Does the plan reference any risk/vulnerability/impact assessment?	Guyadeen et al. (2019)- Table 3
Goals	Does the plan include at least one specific goal related to adaptation or reducing vulnerability to climate change (e.g., reducing development in hazard areas found in the jurisdiction)? Does the plan include at least one specific goal related to community adaptation? Is there a connection and appropriate matching between plan goals to climate or urban hazards?	Guyadeen et al. (2019) - Table 3

Implementation	Does the plan identify timelines for implementation? Does the plan generally identify specific organizations with responsibility for implementation? Does the plan specify resource dedication and allocation to facilitate timely implementation? Does the plan consider financial tools beyond revenue generation such as redistribution and reallocation? Does the plan include barriers and limitations of adaptation?	Guyadeen et al. (2019) - Table 3
Monitoring and Evaluation	Does the plan include a separate section that addresses what needs to be done to monitor and evaluate the plan? Does the plan identify departments responsible for monitoring the plan? Does the plan identify a timetable for updating the plan based, in part, on results of monitoring changing conditions? Does the plan include goals and policies that are quantifiable and based on measurable objectives and/or targets (includes indicators)?	Guyadeen et al. (2019) - Table 3
Inter-organizational coordination	Does the plan include at least one horizontal connection with other local plans/programs (e.g., official plan documents and other climate change initiatives)? Does the plan include at least one vertical connection to federal, provincial plans and regional plans (where applicable) (e.g., provincial legislation on climate change)? Does the plan include at least one connection with community groups and/or climate action groups? Is there a connection and appropriate scalar (or multi-level governance) matching? Plan goals vs municipal capacity (Shi et al., 2016)	Guyadeen et al. (2019) - Table 3 Shi et al. 2016

Participation	Does the plan identify the organizations and stakeholders involved in the plan making process (e.g., staff from different agencies or departments, and politicians) and why and how? Does the plan identify the public as part of the plan making process? Does the plan include a description of the evolution of the plan? Community involvement: does the plan identify community organizations as part of the plan making or implementation process? Does the plan include outreach strategies to facilitate plan implementation within the community?	Guyadeen et al. (2019) - Table 3
Organization and Presentation	Does the plan contain an executive summary or similar section that provides an overview/summary of the plan? Does the plan include a table of contents detailing plan chapters and subheadings? Does the plan include a glossary or definition of terms? Does the plan use clear illustrations (e.g., diagrams and graphs)?	Guyadeen et al. (2019) - Table 3
Uncertainty	Does the plan contain information about climate scenario uncertainty? Does the plan contain formation about policy impact uncertainty? Does the plan contain information about implementation uncertainties (e.g. timeline, funding, etc.)? Does the plan contain any information on maladaptive consequences? Does the plan mention risk associated with policy or adaptation strategy?	Woodruff & Sults (2016)

Equity	Is equity recognized in the plan? Is socio-spatial inequality recognized in the plan? Does the plan identify certain geographic areas that will be disproportionately affected by climate change? Does the plan identify certain demographic populations that will be disproportionately affected by climate change? Are marginalized and vulnerable groups included in the plan? Does the plan identify certain industries that will be disproportionately affected by climate change? Accessibility and understandability of the plan- should the plan be translated into multiple dominant languages of the jurisdiction as part of outreach and communication?	Guyadeen et al. (2019) -Table 3

Indicator Tier 2 Policy Level	**Description and Guiding Questions**	**Sources**
Policy Title	As named in the plan	
Policy Aim/Objective	Is the policy relevant to climate change adaptation? Is the policy addressing social vulnerability along with physical vulnerability? (i.e., does the policy respond to both physical and social consequences of climate change?) Specific policy goals in climate change adaptation	Lesnikowski (2021) - Coding Protocol
Climate Change Hazard Addressed	sea level rise extreme precipitation and inland flooding storms drought wildfires erosion and landslides desertification infectious diseases extreme heat events extreme cold events other	
Policy Sector	land use- Does the plan include at least one policy for efficient land use (e.g., compact	Guyadeen et al. (2019) - Table 3

	development, mixed use, infill, and brownfield)? Transport- Does the plan include at least one policy on transportation, including transportation strategies, transit-oriented development, pedestrian-friendly, and bicycle-friendly transit? Communication- Does the plan include at least one policy for public awareness, education, and participation? Energy- Does the plan include at least one policy on renewable energy (e.g., solar energy and wind energy)? Does the plan include at least one policy on energy efficiency (e.g., energy star ratings and green buildings)? waste management- Does the plan include at least one policy on reducing waste (e.g., landfill methane strategies, recycling strategies, and other strategies for reducing waste)? natural resource management- Does the plan include at least one policy on resource management conservation, such as protecting critical environmental areas and conservation zones (e.g., watersheds, lakes, streams, and tree canopy)? water management- Does	

	the plan include at least one policy on the conservation of water demand and supply (e.g., water metering, greywater reuse, and water restrictions)? food and agriculture- Does the plan include at least one policy on food security and agriculture (e.g., conservation of agricultural lands, support for	

	local farmers, and support for organic food)? hazard reduction- Does the plan include at least one policy on hazard reduction (e.g., locating away from known flood zones)? other	
Equity	Is equity recognized in the policy? Which vulnerable groups are targeted by the policy?	Mach, K. J. et al. (2019)
Uncertainty	Does the policy mention uncertainty regarding policy effects? implementation? Does the policy comment on maladaptive consequences associated with the policy?	Siders, A. R. and Keenan, J. M. (2019)
Implementation	Does the policy include a plan for implementation? Does the policy address financial tools necessary for effective policy implementation? Does the policy include/discuss barriers for policy implementation? Does the policy include delegations of responsibilities?	

Monitoring and Evaluation	Does the policy include a timetable for updating or revisiting the plan? Does the policy include quantifiable and/or measurable objectives?	
Interorganizational coordination	Does the policy include horizontal and/or vertical connections? Does the policy mention collaboration with civil society groups?	
Participation	Does the policy mention the involvement of any stakeholders or civil society actors?	
Uncertainty	Does the policy mention uncertainty regarding impact, implementation, and/or any maladaptive consequences?	
Equity	Does the policy mention equity (distributional, procedural etc.)? Does the policy mention any marginalized or vulnerable groups in either decision-making or impact capacities?	

Appendix B: Survey Questionnaire

Questions	Rational behind the questions	Type of response	Follow up questions
What is your name title, and email?	This questions allows me to keep of the respondents (in case of follow up questions, future research, or if the respondent chooses to withdraw their response). This information is confidential.	Open response: enter name, title, and email	
Which lead municipal department/sector is responsible for the creation adaptation plan?	This question aims to understand which department or sector in the municipality is primarily responsible for the creation of the adaptation plan. This includes responsibilities such as planning and organization, content creation and inclusion, delegation of roles, etc.	Choose one or specify. -Sustainability or climate change unit: Departments or offices within departments dedicated to climate change policy planning -Executive or legislative bodies: Mayor's office, city managers' office, City Council -Public Works and Engineering: Including infrastructure, and transportation: water, roads, public transportation -Finance: Department responsible for budget planning -Emergency Services: public safety services responsible for crime prevention, fires services, emergency medical response	

		-Public Health: public health services, community services -Parks and Environment: parks, water and air management, energy production and delivery services -unclear -other: please specify (Lesnikowski et al., 2021, Appendix A)	
Which lead municipal department is responsible for the implementatio n of the adaptation plan?	This question aims to understand which municipal department or sector in the municipality is primarily responsible for the implementation of the adaptation plan. This includes responsibilities such as budgeting and financial allocations, policy consultations, policy enaction and enforcement, monitoring and follow through etc.	Choose one or specify -Sustainability or climate change unit: Departments or offices within departments dedicated to cliamte change policy planning -Executive or legislative bodies: Mayor's office, city managers' office, City Council -Public Works and Engineering: Including infrastructure, and transportation: water, roads, public transportation -Finance: Department responsible for budget planning -Emergency Services: public safety services responsible for crime prevention, fires services, emergency medical	

		response -Public Health: public health services, community services -Parks and Environment: parks, water and air management, energy production and delivery services -unclear -other: please specify (Lesnikowski et al., 2021, Appendix A)	
When or in what year did your municipality first engage in climate planning?	This question aims to understand when the municipalities first began engaging in discourse regarding climate change impacts specifically.	Open response: enter year	
Has climate chang planning always been a priority or how has the department changed to accommodate climate change planning as a priority?	This question aims to understand how climate planning has evolved within the municipality, from a periphery topic to a priority.	Open response	
Which municipal departments (and/or sectors) were involved in th planning process?	This question aims to understand the diverse array of departments and sectors within the municipality that are involved in the planning process, highlighting the interdepartmental and intersectoral collaboration (as well as the diversity of climate change impacts).	Choose all that apply -Sustainability or climate change unit: Departments or offices within departments dedicated to cliamte change policy planning -Executive or legislative bodies: Mayor's office, city managers' office,	

		City Council -Public Works and Engineering: Including infrastructure, and transportation: water, roads, public transportation -Finance: Department responsible for budget planning -Emergency Services: public safety services responsible for crime prevention, fires services, emergency medical response -Public Health: public health services, community services -Parks and Environment: parks, water and air management, energy production and delivery services -unclear -other: please specify (Lesnikowski et al., 2021, Appendix A)	
Were climate justice and equity explicit considerations within the planning process?	This question aims to understand whether climate justice and equity are explicit, vocal considerations during the planning process. Was the adaptation plan created with an equity and justice perspective embedded into the project or was it an afterthought?	Yes or no	If yes: move on to the following 3 questions If no: skip the next 3 questions
In what context did the topics of climat justice and equity	This question aims to understand the context in which climate justice and	Choose all that apply -top-down	

arise?	equity were brought to the municipality. I want to understand whether there were hierarchical, top-down pressures or whether these topics were raised as concerns by civil society groups, NGOs, etc.	pressures (federal or provincial requirements) -private sector consultancy - consultancy with civil society groups (community organizers, non-profit actors, etc.) -other: please specify -unclear	
How were climate justice and equity interpreted by different participants in the context of the plan-making process?	This question aims to understand the different perspectives and objectives behind each stakeholder's interpretation of equity. The municipal department may understand equity differently than a student led climate activist group, for example.	Open response	
Were there differer perspectives on how to bring in equity considerations to the adaptation plan? .	This question aims to understand how the different perspectives of equity were incorporated into the plan. For example, this could include stakeholders proposing policies/projects specifically targeting vulnerable populations or the Public Works department leading an infrastructural update for affordable housing units	Yes or no	If yes: Could you briefly describe the different perspectives?
What types of tools did your municipality use in developing the adaptation plan? specify	This question aims to curate a list of tools that municipalities have access to and utilized in the development of the adaptation plan.	Choose all that apply ●BARC (ICLEI) (Building Adaptive & Resilient Communitie) ●C40 (C40 Cities Climate Leadership Group Inc.) ●ECCC (Environment and Climate Change	

		Canada) ●Other: Please specify None	
What informational resources did your municipality rely on to facilitate the creation of the adaptation plan?	This question aims to curate a list of informational resources that municipalities have access to and utilized in the development of the adaptation plan.	Choose all that apply ●ECCC (Environment and Climate Change Canada) ●FCM (Federation of Canadian Municipalities) ●Ouranous Inc. ●Private sector consultants ●Academics/ researchers affiliated with an accredited institution ●Federal climate change assessments ●Provincial climate change assessments ●Local climate change Assessments ●Local or traditional knowledge sources ●Indigenous knowledge sources ●Other: please specify ●None	
What procedural challenges did you face during the development of the adaptation plan?	This question aims to give the responder space to articulate any procedural challenges in the development of the adaptation plan. Answers may range from financial challenges to leadership challenges and could help uncover new barriers in light of heightening climate change impacts.	Open response	

Was there active collaboration and partnership between the lead municipal department and civil society groups during the plan development process?	This question aims to understand whether the municipality involved non-state, non-profit organizations in the development of the adaptation plan, helping evaluate procedural justice in terms of inclusivity. Active collaboration and participation are concepts taken from Arnstein's (1969) conceptualization of citizen participation. At the participation rung of the ladder, planning and decision-making responsibilities are shared between citizens and public officials (as well as public institutions and administrators) (Organizing Engagement, 2019).	Yes or no	If yes: What civil society groups were involved in the development of the adaptation plan? If not: Could you describe any challenges or restrictions which prevented this collaboration?
Was there active collaboration and partnership between the lead municipal department and private sector groups during the plan development process?	This question aims to understand whether the municipality involved private sector, for-profit organizations in the development of the adaptation plan, helping evaluate the involvement of private sector capital and interests in public provisioning.	Yes or no	If yes: What types of private organizations or companies were involved in the development of the adaptation plan? If no: Could you describe any barriers or restrictions that prevented this collaboration?
Is there sufficient funding to implement the climate adaptation plan?	The aim of the question is to understand whether there is adequate financial support to implement the adaptation plan and whether budgetary concerns were a priority during the adaptation plan development process.	Yes or no	If yes: How did your department overcome funding challenges and barriers? If not: How is the department acquiring

			funding and how does this impact the timeline of implementation ?
Did your municipality use any external (private sector, civi society, NGO, etc.) funding to create the plan?	The aim of this question is to uncover any external funding streams municipalities may have used during the development of the plan.	Yes or no	If yes: Which external funding did your municipality use?
Is the political landscape an important driver in climate policy decision-makin g for your municipality?	The aim of the question is to investigate the perceived influence of local politics and the local political landscape in the development of climate policy.	Yes or no	If yes: Could you describe the general political leaning of your jurisdiction and how those influences policy-making decisions? If not: What would you describe as important drivers of climate policymaking?

Appendix C: Relevant Quotations

Document	Quotation Content	Context	Codes
EQUITY AND FACTBASE QUOTES			
comox_valley sustainability strategy	Rationale: All workers should have access to a wage that is sufficient to meet their basic needs of food, shelter, clothing and healthcare. The definition of wage should also take barter systems into consideration. For some individuals or households, employment will not be possible and assistance will be necessary.	economic	d equity Factbase
yarmouthClimate Change Action Plan	Climate change impacts will affect people employed along the waterfront as they may lose income and work opportunities due to the impacts of sea-level rise and storm surge events. It is important in the aftermath of these events to enable these waterfront facilities to rebound as soon as possible to allow those affected to regain their employment opportunities.	economic	d equity Factbase
oakville_climate-change-strategy	When disturbances in electricity are experienced there are many health and safety risks associated. The loss of power could result in: o Loss of air conditioning or heating affecting vulnerable population.	energy	d equity Factbase
Beaver_County_Climate_Resilience_Express_Action_Plan	Increased risk of flooding in lowlying areas of communities from extreme precipitation events and storms	Flooding	d equity Factbase
toronto-resilience-strategy	EQUITY IMPACT This action aims to support all homeowners and renters, but with a specific focus on those groups which are most vulnerable to flooding: those who have been flooded in the past, and those who live in basements. Anecdotal evidence suggests that basement dwellers, particularly renters, are more likely to be part of an equity seeking group such as lower-income Torontonians or new Canadians, and that basement renters are less likely to have insurance or access to support in case of a flood. This project will also support the City in better understanding the demographics of climate vulnerability in Toronto's homes, a key input required to support an equity focus in actions such as B1.4, which intends to use social vulnerability data to target other investments.	Flooding	d equity Factbase
toronto-resilience-strategy	EQUITY IMPACT The flood mapping tool will include data regarding equity-seeking groups and other vulnerable populations, where possible, so that it can be used in decision making about reducing flood risk. The tool will then enable integrated planning, which will help focus on reducing system impacts of flooding, which disproportionately impact the most vulnerable (i.e. a focus on power or transit outages rather than only on a person's home flooding).	Flooding	d equity Factbase
toronto-resilience-strategy	EQUITY IMPACT An integrated planning approach to flooding, and collaboration between different stakeholders, is more effective at offsetting the cascading effects of flooding caused by interdependencies, such as power outages or transit disruptions. Flooding and its knock-on effects disproportionately impact vulnerable and low-income Torontonians.	Flooding	d equity Factbase
yarmouthClimate Change Action Plan	As part of the ACAS project, the School of Dalhousie has undertaken a "Social Vulnerability of Social Assets at Risk" study and has identified Yarmouth South as 17 the most vulnerable segment of the Town's population. Unfortunately, this area is also prone to local flooding associated with heavy rainfall events as the water makes its way through the Broad Brook watershed system.	Flooding	d equity Factbase
oakville_climate-change-strategy	Encourage food sharing programs such as the programs developed by the Oakville Sustainable Food Partnership.	food	d equity Factbase
calgary_climate-strategy-july-2022	The impacts of climate change affect all Calgarians; however, adverse impacts of climate change are felt disproportionately by equity-deserving people. As a city, Calgary must ensure we adapt to a changing climate so that no one is left behind in our efforts to address the climate crisis and that all Calgarians are empowered to take climate action.	generic	d equity Factbase
calgary_climate-strategy-july-2022	The challenges of climate change are intertwined with those of social and economic inequality. Structural inequities (arising from our existing social conditions) will continue to make equity-deserving communities more susceptible to the impacts of climate change.	generic	d equity Factbase
calgary_climate-strategy-july-2022	Engagement efforts during development of the Strategy have shown that equity-deserving Calgarians overwhelmingly desire greater choice and autonomy as they face climate change-related issues. Improved transit, lowered energy costs, improved access to green space, and access to spaces to share their experience will enhance their resilience and provide opportunities to focus on contributing to climate solutions.	generic	d equity Factbase
calgary_climate-strategy-july-2022	Calgary will be impacted by climate change, some groups are more vulnerable than others and will feel the impacts sooner and more drastically . Vulnerability to climate-related events is influenced by intersecting factors such as access to healthcare, community resources, information, and social supports; systemic social inequities; neighbourhood/geographical location; and access to social and financial capital . People that are more likely to disproportionately face climate impacts can include seniors, youth, individuals with existing health challenges, Indigenous Peoples, racialized communities, women, single-person households, and those who lack the financial resources to prepare for and respond to climate change . Each community in Calgary will face unique climate risks based on population density and the amount and state of built and natural infrastructure in each community .	generic	d equity Factbase
Cambridge_climate_adapt_plan_20190823_access	VULNERABILITY It is important to recognize that each region, city and community will have their own unique sets of challenges when addressing climate change – not all communities are the same. Vulnerability is a measure of the extent to which a community, region, or city is susceptible to, or unable to cope with, the negative effects of climate change.	generic	d equity Factbase
Cambridge_climate_adapt_plan_20190823_access	THE SOCIAL – vulnerable populations including seniors, those with chronic health conditions, and individuals facing homelessness are disproportionately affected by extreme weather and climate-related impacts.	generic	d equity Factbase
cape_bretonMCCAP_Final_Report_adopted_by_Council	Low-income residents are more vulnerable to climate change hazards and impacts. Emergency measures organizations recommend that all households have 72 hours of resources, like food and water, on hand for emergencies. Having these resources available is challenging for residents with tight budgets and fixed incomes. Low-income residents without vehicles may not be easily able to safely evacuate an area in case of an emergency, especially as fire fighter volunteer capacity is reduced over time due to the aging population.	generic	d equity Factbase
cityofkamloops_communityclimateaction plan_june2021_final_0	Climate change will affect people differently, with those who are already disadvantaged by poverty and inequality often contributing less to emissions but bearing the brunt of its impacts.	generic	d equity Factbase
comox_valley sustainability strategy	Undertake a social needs assessment, including the identification of funding needs and potential sources, and review existing facilities and programs to ensure that they meet social planning needs and goals of the region.	generic	d equity Factbase
comox_valley sustainability strategy	Work together to highlight issues and develop strategies to increase safety for all residents and visitors with additional attention to women and children, visible minorities, transgendered residents, physically and mentally challenged residents, the homeless and others who may be at risk.	generic	d equity Factbase
Coquitlam_Climate_Adaptation_Strategic_Plan_-_Final_Report_by_WSP_	The impacts of climate change are not discrete. Vulnerable communities are more exposed to change and less able to adapt. Today, we have already begun to witness the impacts of climate change, with 2019 seeing numerous broken records for heat, water supply, and energy demand. The consequences of climate change are here, visible and expensive.	generic	d equity Factbase
Halifax_HRM_HaliFACT_vNew Logo_	In addition to a just transition, Halifax can preferentially deploy strategies or actions that simultaneously deliver other objectives related to health, equity, poverty alleviation, and reconciliation.	generic	d equity Factbase
Halifax_HRM_HaliFACT_vNew Logo_	Not all people will be affected equally by climate change. Distinct groups, communities, and populations will be disproportionately affected by climate change due to one or more of the following factors: increased exposure to climate risks, increased sensitivity to climate risks, and limited adaptive capacity for coping with climate impacts. Similarly, not all will be able to equally contribute to the significant action and investment required to decarbonize.	generic	d equity Factbase
Halifax_HRM_HaliFACT_vNew Logo_	Equity: The climate action plan needs to ensure that its activities equitably address the risks of climate change and share the costs and benefits of action across the municipality. Considerations include impact on access to services, household incomes, economic opportunities, investment in infrastructure and others.	generic	d equity Factbase
hamilton climate change impact adaptation plan	Low-income tenants of basement apartments are particularly vulnerable, especially if displaced by repairs and renovations.	generic	d equity Factbase
hamilton climate change impact adaptation plan	Low-income households are more vulnerable, and this will also affect community resources attempting to address this need (e.g. food banks).	generic	d equity Factbase
kitchner_Community-Climate-Adaptation-Plan---Full-ACCESS	To address the first Guiding Principle regarding equity, the Sustainable Societies Consulting Group was retained to explore the needs of marginalized community members with respect to climate change adaptation. They conducted outreach to social service providers, community/ neighbourhood groups, people with lived experiences of marginalization, and Indigenous people living in the community	generic	d equity Factbase
kitchner_Community-Climate-Adaptation-Plan---Full-ACCESS	Current practice (continued) □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ - Wellbeing WR is working to build social inclusion seeking equity, preventing isolation and strengthening belonging	generic	d equity Factbase
Richmond_climatereport60107	The Canadian Urban Sustainability Practioners34 (CUSP) network have developed Canadian-specific resources for how to address equity issues when undertaking climate action work. They note that the 'growing wealth disparity between low- and moderate-income households and other underserved groups and those with greater affluence is reflected through the disproportionate uptake of clean technologies by higher-income households in U.S. and Canadian municipalities'.	generic	d equity Factbase
Saskatoon_Climate Action Plan	In Canada, climate conversations often disregard the historical legacy of colonization, which has included relocating First Nations, forcibly removing children from their families and placing them in Residential Schools, and prohibiting the use of traditional languages and practices, among other atrocities. Climate change exacerbates many of the resulting impacts of colonization, including those relating to mental health and well-being, poverty, poor housing, food and water insecurity, and the erosion of rights, culture, and access to lands. The lived reality of First Nations needs to be understood and incorporated into analyses of the distribution and experience of climate-related impacts. In this regard, addressing the climate crisis cannot be separated from the broader project of First Nations self-determination and reconciliation.	generic	d equity Factbase
toronto-resilience-strategy	Equity is distributing opportunities and resources by accommodating different needs and removing barriers in order to level out unfair and unjust outcomes so that all individuals can benefit. Advancing equity is a core component of building resilience	generic	d equity Factbase
toronto-resilience-strategy	Not all communities will be affected equally by climate change. Equity-seeking groups face an unequal distribution of opportunities and resources, and therefore face greater challenges preparing for, responding to, and recovering from climate shocks and stresses	generic	d equity Factbase

toronto-resilience-strategy	*While Indigenous peoples in Toronto face inequities, they are not listed as an equity-seeking group. Indigenous peoples are the original inhabitants of what is today Toronto, and have a special status recognized under section 35 of the Constitution. Many believe that Indigenous peoples do not seek equity but rather reconciliation and a restoration of the health, wellness, self-determination and sovereignty, which were eroded through historical and ongoing colonization.	generic	d equity Factbase
Vancouver_climate-change-adaptation-strategy	The City of Vancouver defines equality as the equal provision of services to all; equity is about providing equal access to opportunities and services or equal possession of basic needs, based on equal outcomes. In the climate change context, being part of a frontline community or equity seeking population should not translate to less resilience to climate change	generic	d equity Factbase
windsor_Climate Change Adaptation Plan - FINAL	It is critical for communities to understand that climate change does not affect all social systems equally. Those most vulnerable may include community members who are low income, chronically ill, lack a social network, elderly, those living in isolated dwellings, or facing other systematic barriers (Health Canada, 2018). These groups are typically vulnerable to harm from climate impacts as they have fewer resources to prepare for changing conditions or to offer help when needed. Each community is unique, and effort is required to identify and support those who are most vulnerable to climate-related risks	generic	d equity Factbase
WinnipegsClimateActionPlan	The City of Winnipeg has a significant opportunity to pursue land use strategies that align with climate mitigation through the implementation of compact, complete communities, transit-oriented development, increased infill and higher density neighbourhoods. Complete communities are places that both offer and support a variety of lifestyle choices, providing opportunities for people of all ages and abilities to live, work, shop, learn and play in close proximity to one another.	generic	d equity Factbase
WinnipegsClimateActionPlan	Done well, densification creates vibrant spaces, and can increase viability of frequent transit and other diverse mobility options, as well as proximity to work, school, and recreational opportunities. These actions have co-benefits related to public health, including increased outdoor physical activity and access to healthy foods. As well, amenities within close proximity to where people live and work equalize opportunities, especially amongst people disadvantaged by income or other barriers. The contribution of land use to overall GHG emission reductions is inextricably linked to decision making in the transportation and built environment sectors	generic	d equity Factbase
WinnipegsClimateActionPlan	By approaching climate mitigation through the lens of 'all things being connected', Winnipeg realizes holistic co-benefits from climate change action that increases jobs and economic activity, improves health outcomes of citizens, and increases social equity and affordability for Winnipeggers.	generic	d equity Factbase
Antigonish_Plans and Strategies - Municipal Climate Change Action Plan 2013	Increased health risks to vulnerable populations, increased risk to public on streets.	health	d equity Factbase
Barrington_Municipal Climate Change Adaptation Plan	. On the human scale, Nova Scotia's very old and very young may become vulnerable to the health effects of air pollution and heat waves, and local economies and buildings may become threatened by extreme climactic shifts. Climate change poses significant risk to all Nova Scotians.	health	d equity Factbase
Beaver_County_Climate_Resilience_Express_Action_Plan	Increased risk of heat stress on vulnerable populations (aging demographic) due to more extreme heat events	health	d equity Factbase
cape_bretonMCCAP_Final_Report_adopted_by_Council	Another characteristic is the increasing demographic age, along with lower than average income. These two factors increase the vulnerability of portions of the population to emergency situations such as loss of power or interruption of water supply, especially when temperatures are extremely high or low. The aging population can also be more sensitive to health issues than younger and more prosperous communities in the province. Another factor increasing risk is the lack of appropriate people to volunteer for emergency services, such as volunteer fire fighters.	health	d equity Factbase
HaltonHills_CCAP 2020	Rising temperatures can lead to health issues for residents, like heat stroke and dehydration, especially among more vulnerable populations like young children, seniors, and low-income households without air conditioning.	health	d equity Factbase
Huron-Kinloss-Climate-Change-and-Energy-Plan_REVISED-December-2020	Increased summer temperatures, resulting in an increased frequency and duration of extreme heat days (>30 C), causing increased health and safety risks to the public, especially vulnerable populations (e.g. elderly, socially isolated, etc.).	health	d equity Factbase
kingstonClimate Leadership Plan FINAL	Increase in heat-related health risks, especially for vulnerable groups such as elderly, youth, and low income individuals	health	d equity Factbase
Nanaimo_climate-change-resilience-strategy-(2020)	Increased incidence of heatrelated illness and stress, especially among vulnerable residents	health	d equity Factbase
Nanaimo_climate-change-resilience-strategy-(2020)	Increased stress and anxiety, especially for those most vulnerable Access challenges and safety risk for first responders	health	d equity Factbase
Richmond_climatereport60107	They note that heat-related illnesses such as heat exhaustion, heat stroke "in extreme situations, can lead to permanent disability or death" noting that older adults, people with chronic conditions, people on certain medications, infants and young children are especially sensitive to the health effects of heat	health	d equity Factbase
st__albert_cap_final	Hotter summer temperatures could cause a variety of health problems, such as heat exhaustion and heat stroke. This is especially concerning for vulnerable populations, including the elderly, infants, homeless, and those who live in dwellings without air conditioning.	health	d equity Factbase
toronto-resilience-strategy	EQUITY IMPACT The impacts of extreme heat are disproportionately felt by equity-seeking groups, including people with low incomes, people who are homeless or under-housed, and other vulnerable groups, like seniors, people who are isolated, and people with pre-existing health issues. The action plan and long-term strategies to mitigate the impacts of heat will identify and implement strategies that address the needs of these equity-seeking groups.	health	d equity Factbase
trois rivieres_Plan_d_adaptation_aux_changements_climatiques	Les vagues de chaleur sont reconnues pour avoir un impact sur la santé des populations vulnérables (maladie chronique, personnes âgées, enfants).	health	d equity Factbase
trois rivieres_Plan_d_adaptation_aux_changements_climatiques	Certains éléments climatiques pourraient augmenter l'occurrence de mortalité chez certains groupes de population. Il est important d' identifier les risques afin de les intégrer dans les mesures d'urgence.	health	d equity Factbase
Vancouver_climate-change-adaptation-strategy	Climate change shocks and stresses do not affect all groups in the community equally. Frontline communities and those that have been affected by systemic vulnerabilities and inequities (including racialized communities/people of colour, lower income communities, immigrant and refugee communities, people with disabilities and older adults) are often at greater risk from the impacts of climate change and often have the fewest resources to respond. Those with existing health issues, young children and pregnant women can also have an increased risk to extreme events and poor air quality.	health	d equity Factbase
Burnaby_Climate Action Framework (2020.07.06)	An equity lens is important to ensure that lower-income neighbourhoods 11 Ecologically healthy and climate-resilient greenspaces are biologically diverse, include site-appropriate native and other plant species, and are appropriately managed for succession, longevity and resistance to disease. Burnaby's greenspaces include conservation and restoration areas, streamside areas, street trees, public and private landscaping, raingardens, and passive and active parks. 12 Burnaby's current tree canopy cover is 34%, just above the regional average (2014 data from: Metro Vancouver, Regional Tree Canopy Cover and Impervious Surfaces, p. 11). 13 Note that urban forests are neither large enough nor long-term enough (sustained over thousands of years) that they can provide significant levels of carbon sequestration. The urban forest is therefore not intended to offset fossil fuel emissions; however, urban greenspace can reduce summer energy demand, improve public health and provide ecological benefits. To: £nvironment Committee From: Director Corporate Services Director Planning and Building Re: CL/MAT£ ACTION FRAM£WORK 2020 March 11..... Page 17 are equally considered in planning and programs, achieving equitable benefits from street trees and access to natural areas and public parks.	land use and planning (green infrastructure)	d equity Factbase
toronto-resilience-strategy	EQUITY IMPACT These towers have the highest concentration of resilience risks, such as exposure to heatwaves and power failures, and a high concentration of vulnerability, such as low-income families, seniors living alone, new Canadians, and single-parent households. This action improves housing quality – a major determinant of vulnerability – among equity seeking groups. Deep retrofit investment in towers also presents a generational opportunity for social, economic, and environmental improvements to tower neighbourhoods. There is a significant opportunity to create local jobs, support innovation, and drive investment in lower-income communities through retrofits.	land use and planning (green infrastructure)	d equity Factbase
hamilton climate change impact adaptation plan	Residents using mobility devices and new parents with children in strollers will be more vulnerable to poor sidewalk conditions.	mobility	d equity Factbase
WinnipegsClimateActionPlan	Convenient access to public transit encourages equity by enhancing mobility among people with barriers to transportation, including older adults, people with low incomes, and those living with disabilities. Investments in active transportation infrastructure and enhanced maintenance over winter months ensure people-powered transportation is more convenient, accessible and increases road safety. Using transit, walking, or cycling to get around contributes to increased physical health and mental health benefits through increased social connectedness and interaction.	mobility	d equity Factbase
Durham region DCCAP_Print	This program is designed to strengthen the fabric of our society in several ways: · Public education and training: ° A training program for community volunteers and service club members to provide response and assistance to residents and businesses in times of weather emergency; ° Information on access to food and potable water and safe preparation and preservation of food during an extended power failure; and ° A special focus on vulnerable people (such as the elderly, isolated people and those with medical situations) and their support systems.	Communication/public outreach	d equity
EQUITY AND ADAPTATION ACTION QUOTES			

GreaterSudbury_Addendum - June 13, 2023	Action 11.1 Increase efforts to communicate with and aid vulnerable residents, including those with inadequate housing or those with medical and social support needs. • Action 11.2 Develop and deliver customized education programs on adapting to climate change for targeted audiences. • Action 11.3 Increase available shade in the community. • Action 11.4 Maintain current cooling or warming centres and emergency evacuation centres. • Action 11.5 Encourage employers to identify and address potential climate impacts on their workers and protect them from increased exposure to extreme heat, wildfire smoke and vector-borne diseases as recommended by Health Canada and the Ontario Ministry of Labour, Immigration, Training and Skills Development. • Action 11.6 Implement the Active Transportation Plan and Transportation Master Plan.	communication/public outreach	adaptation action d equity
Burlington_Appendix A to EICS-12-22	4-1 Enhance emergency notification and communications plan incorporating needs of vulnerable populations	communication/public outreach	adaptation action d equity
surrey_ClimateAdaptationStrategy	Provide “Firesmart” education to the Surrey public, targeting residents in close proximity to areas of high and moderate risk of wildfire	communication/public outreach	adaptation action d equity
surrey_ClimateAdaptationStrategy	Continue to build community capacity to respond effectively in an emergency (i.e. neighbours helping neighbours)	communication/public outreach	adaptation action d equity
montreal_climate_plan_2020_2030_vdm	The participation of all Montrealers will be essential to the success of the ecological transition. To become engaged in the process, residents will have to be stakeholders in the changes being made. Montréal will therefore put in place awareness programs that emphasize the advantages of achieving the ecological transition in several spheres such as health, quality of life, mobility and finances. Montréal will devote particular attention to the main groups that are vulnerable to climate change.48 These groups include seniors, children, the homeless, people whose situation is precarious and those living in poverty.	communication/public outreach	adaptation action d equity
calgary_climate-strategy-july-2022	1.4 Strengthen relationships with community-based organizations to support their efforts to develop, promote and utilize climate adaptation practices and strategies, and to help The City engage with equitydeserving community members and groups.	communication/public outreach	adaptation action d equity
calgary_climate-strategy-july-2022	11.2 Improve funding for climate-resilient housing for low-income earners through collaboration with funders and community groups who support affordable and non-market housing. The need to improve climate resilience in equity-deserving populations can be met in part through adequate, safe, and accessible housing.	communication/public outreach	adaptation action d equity
saint lambert2021-2030-plan_developpement	Reinforce the social fabric by focussing on inclusion and intergenerational dialogue	communication/public outreach	adaptation action d equity
Halifax_HRM_HaliFACT_vNew Logo_	34 Work purposefully, meaningfully, and collaboratively, with the Mi’kmaq and other groups seeking reconciliation, including African Nova Scotian communities	communication/public outreach	adaptation action d equity P equity Participation
comox_valley sustainability strategy	Objective 7.3.3: Increase the profile and involvement of Comox Valley First Nations in all planning and decision making processes, as well as in the economy and local cross-cultural events.	communication/public outreach	adaptation action d equity P equity
yarmouthClimate Change Action Plan	CC-13 It shall be the intention of Council to support EMO in undertaking a Climate Change Emergency Plan to identify and help prioritize an action plan to minimize potential impacts on the most vulnerable segments of our community in light of the climate change 18 impacts associated with storm surges, sea-level rise and intense rainfall events.	emergency response	adaptation action d equity
yarmouthClimate Change Action Plan	One way could be the development of a Vulnerable Registry (City Watch Program) that will assist first responders in the delivery of their services. In 2012 EMO has initiated the development of the City Watch program which will enable citizens to register so that first responders are prepared for their particular circumstance in time of need.	emergency response	adaptation action d equity
st__albert_cap_final	Create an emergency response program for vulnerable populations to stay overnight at designated clean air facilities when outdoor air quality is hazardous Program Medium	emergency response	adaptation action d equity
Cambridge_climate_adapt_plan_20190823_access	Action 2 } Develop a prioritized list of strategic properties to serve as emergency support centres Review the portfolio of City-owned buildings and designate buildings to provide support functions during extreme weather events. This would include existing buildings designated as critical support centres and cooling/warming centres. Identify any gaps in coverage to ensure equitable access to residents and identify any future or unmet needs. Consider opportunities to create flexibility in existing buildings to provide emergency support functions rather than relying on constructing new facilities. Review bylaws and emergency regulations to include protections or exemptions for alternate uses of select buildings during extreme weather events to serve as ancillary cooling or warming centres	emergency response	adaptation action d equity
Huron-Kinloss-Climate-Change-and-Energy-Plan_REVISED-December-2020	Objective 10: Improve Township response to and recovery from extreme weather events Action 10.1 – Implement warming and cooling centres outside of normal business hours. Action 10.2 – Continue to provide rigorous communications to the public regarding road conditions and municipal facility closures during extreme weather events. Action 10.3 – Undertake business continuity planning and staff training to plan for the Township's essential and secondary services and ensure informed response to extreme weather events.	emergency response	adaptation action d equity
kitchner_Community-Climate-Adaptation-Plan---Full-ACCESS	Action 1.7: Explore options to establish one or more vulnerable persons’ registries to guide emergency responders and/or other assistance programs to reduce health impacts in extreme weather events	emergency response	adaptation action d equity
Vancouver_climate-change-adaptation-strategy	Amend the Zoning and Development By-law to ensure that flood plain development is done in a manner that protects people, property, and the natural environment from the consequences of flood hazards and enables future flood management infrastructure.	Flooding	adaptation action d equity
HaltonHills_CCAP 2020	4.1 Halton Hills is prepared for an increase in climate refugees 4.2 Local food security is protected 4.3 Local businesses and tourism are protected	generic	adaptation action d equity
comox_valley sustainability strategy	Work to reduce homelessness in the Valley in a crossjurisdictional and integrated manner, including addressing the recommendations of the Comox Valley Task Force on Homelessness.	generic	adaptation action d equity
comox_valley sustainability strategy	Work towards regional cooperation through discussion around provision and location of special needs residential facilities (e.g. addiction recovery centres).	generic	adaptation action d equity
surrey_ClimateAdaptationStrategy	Continue to collaborate with community organizations and service agencies to improve the socioeconomic conditions and health outcomes of vulnerable populations	generic	adaptation action d equity
calgary_climate-strategy-july-2022	2.1 Complete community climate risk profiles for all existing Calgary communities that detail community specific drivers of climate risk, characteristics that may cause vulnerability, urban heat island analysis and equity considerations. The community climate risk profiles will inform strategies and plans to reduce the unique sources of climate risk and guide risk-reducing investments within each community.	generic	adaptation action d equity
Coquitlam_Climate_Adaptation_Strategic_Plan_-_Final_Report_by_WSP_	Plan and implement clean air shelters to protect vulnerable communities from reduced air quality	health	adaptation action d equity
Coquitlam_Climate_Adaptation_Strategic_Plan_-_Final_Report_by_WSP_	Explore measures to protect vulnerable communities from heat waves (e.g. cooling stations and/or shelters)	health	adaptation action d equity
Selwyn-Community-and-Corporate-Climate-Action-Plans	Conduct a local community vulnerability assessment of public health impacts from climate change to identify climate risks on vulnerable populations (in partnership with all communities).	health	adaptation action d equity
HaltonHills_CCAP 2020	Vulnerable populations are protected from hotter temperatures	health	adaptation action d equity
Richmond_climatereport60107	The City encourages the use of Richmond community centres, community centres, pools, water parks, libraries and arenas, as clean air cooling stations for residents vulnerable to heat stress and/or respiratory conditions. The City also provides tips for staying cool from provincial and federal health ministries.	health	adaptation action d equity
Burlington_Appendix A to EICS-12-22	3-1 Develop program to support vulnerable populations in installing and maintaining cooling systems	health	adaptation action d equity
Burlington_Appendix A to EICS-12-22	3-2 Identify gaps in public space cooling by assessing utilization of current cooling facilities and identifying the type of cooling supports and accessiblity needs of the community especially for vulnerable populations	health	adaptation action d equity
surrey_ClimateAdaptationStrategy	Engage vulnerable neighbourhoods in programs that keep indoor and outdoor environments cool (e.g. energy retrofit programs, tree planting and water fountain installations)	health	adaptation action d equity
hamilton climate change impact adaptation plan	Objective 3: Help vulnerable populations (i.e. seniors, youth, outdoor workers, those experiencing homelessness, with pre-existing health conditions, etc.) avoid or reduce health-related impacts of extreme weather and temperatures (including flooding).	health	adaptation action d equity
Durham region DCCAP_Print	H2: Property Standards By-Laws for Maximum Temperature Allowed in Apartments The purpose of these by-laws in each municipality is to reduce the health risk to tenants (and especially to vulnerable populations) in multi-residential buildings (mostly apartments) from exposure to extreme heat during heat waves. The populations that are most vulnerable to extreme heat are young children, the elderly, those with pre-existing illnesses, low incomes, and those who are socially isolated.	health	adaptation action d equity
saint eustache_placc_document_synthese_vf-vse-_30_mars_2023	Augmenter l'accès à l'eau potable dans les lieux publics, notamment dans les secteurs de vulnérabilité aux vagues de chaleur, par exemple en installant sur des bornes-fontaines des systèmes itinérants de distribution d’eau potable et de brumisateurs	health	adaptation action d equity

yarmouthClimate Change Action Plan	8.28 It shall be the intention of Council to design and construct public streets in such a fashion to accommodate a lineal bike lane with a minimum width of 1.5 m (4.92 ft.).	land use and planning (green infrastructure)	adaptation action d equity
Burnaby_Climate Action Framework (2020.07.06)	Under-utilized open park spaces and unused road right-ofways, some of which are currently treed, should be considered for addition to the urban forest, and rezoned to parkland where appropriate. Spatial distribution and analysis will include equity considerations to ensure that all neighbourhoods have cooling urban forests/parks.	land use and planning (green infrastructure)	adaptation action d equity
comox_valley sustainability strategy	Develop both mandatory and voluntary Adaptable Design Guidelines to increase the availability of accessible housing to ensure it addresses the needs of a growing elderly population.	land use and planning (green infrastructure)	adaptation action d equity
montreal_climate_plan_2020_2030_vdm	Montréal will adapt its rental housing stock to the imperatives of ecological transition while respecting tenants' rights and ability to pay. It will raise tenants' and landlords' awareness about the Québec legislative framework. In some cases, obtaining real social equity will require more sustained actions by public authorities, both provincial and municipal, particularly regarding the most vulnerable populations. The city is also committed to including a specific component to protect the affordable rental housing stock in a five-year Housing Action Plan. This plan will be the subject of a public report presenting the means mobilized and the results obtained.	land use and planning (green infrastructure)	adaptation action d equity
saint lambert2021-2030-plan_developpement	Develop a diversiff ed housing o□ er for young families, seniors and low-income earners	land use and planning (green infrastructure)	adaptation action d equity
Cambridge_climate_adapt_plan_20190823_access	Action 6 } Support the Region of Waterloo in efforts to maintain acceptable indoor temperatures for affordable rental housing units The Region of Waterloo is a partner for the management of affordable rental housing units in Cambridge. Work with the Region to support policies and programs to protect tenants from excessive heat and to check in on vulnerable individuals or groups during heatwaves or periods of extreme temperature.	land use and planning (green infrastructure)	adaptation action d equity interorganizational coordination
PROCEDURAL EQUITY QUOTES			
WinnipegsClimateActionPlan	The aspirations for climate change action in Winnipeg are grounded in traditional worldviews of Indigenous Peoples and in harmony with their distinctive spiritual relationship with the land and natural resources: our actions today need to have sustainable implications for the energy, water, natural resources, and people seven generations into the future. This perspective is reflected in an excerpt from Winnipeg's Indigenous Accord Vision: "The City of Winnipeg is a place where everyone has a voice, a place where people and the environment come first, where everyone has fair access…" The Accord Vision was developed by children gathered in harmony to visualize the future of Winnipeg and it serves as a starting place for Winnipeg's Climate Action Plan vision.		Factbase P equity
WinnipegsClimateActionPlan	Establish a Community Advisory Committee representative of the local population and a series of Community Action Teams to provide strategic advice and guidance during the implementation of the Plan		P equity Participation
WinnipegsClimateActionPlan	Engage with the Mayor's Indigenous Advisory Circle twice a year to solicit feedback on actions, priorities, and opportunities for engaging Winnipeg's Indigenous community		P equity Participation
yarmouthClimate Change Action Plan	However, there needs to be better coordination between vulnerable groups and EMO to help minimize the adverse affects of climate change impacts.		d equity Goals P equity
HaltonHills_CCAP 2020	Youth Engagement Student Volunteers		P equity Participation
Saskatoon_Climate Action Plan	I. Engage with internal staff to better understand how community needs may be impacted by climate change.		adaptation action P equity
Saskatoon_Climate Action Plan	The Assembly of First Nations (AFN) published the Declaration of a First Nations Climate Emergency Resolution in May 2019 and in March 2020, at the AFN Climate Gathering, a discussion paper on a First Nation's Climate Lens was presented along with discussions and sessions on its practical expression12.		P equity Participation
Nanaimo_climate-change-resilience-strategy-(2020)	1.1.4. Establish a water governance committee or board to guide water sharing arrangements with neighbouring communities and First Nations groups		adaptation action interorganizational coordination P equity
GreaterSudbury_Addendum - June 13, 2023	To develop the CCCAP, City staff, Atikameksheng Anishnawbek, Wahnapitae First Nation and community stakeholders were engaged to collectively identify key vulnerabilities for our region related to climate change impacts. Eleven impact statements were developed that helped identify vulnerabilities such as an increase in public health concerns due to increasing summer temperatures and wildfire, as well as an increase in damaged powerlines due to increased wind, flooding and freezing events.		local climate hazards P equity Participation
GreaterSudbury_Addendum - June 13, 2023	To support the City's planning process, ICLEI Canada conducted a gap analysis of the climate impacts and results of risk and vulnerability assessments. An equity, diversity and inclusion (EDI) lens was used to ensure alignment with the BARC process and account for vulnerable populations that may be at greater risk to the effects of climate impacts. These groups include seniors, Indigenous peoples, low-income residents, persons with low literacy levels, transient populations, persons with a disability, medically dependent persons, children and youth, women, new immigrants, and racial or cultural minorities, among other populations. Through public consultation at the public risk and vulnerability assessment workshop, the 40 impact statements were reviewed by multiple stakeholders		d equity P equity Participation
Burlington_Appendix A to EICS-12-22	The VRA was largely informed by a bottom-up, participatory approach that recognizes the skills and experiences of City staff and a range of community stakeholders, who are engaged throughout in the co- production of outcomes at each stage.		P equity Participation
Halifax_HRM_HaliFACT_vNew Logo_	More than 250 internal and external stakeholders from all levels of government, utilities, nonprofits and advocacy groups, academics and educators, industry, the Mi'kmaq, African Nova Scotian communities, Acadian groups, youth and more helped develop the plan. Stakeholder meetings were supported and facilitated by a community engagement consultancy, New Leaf Drawings throughout the plan by artist Emma Fitzgerald meld art with science and highlight the importance of place and community..		P equity Participation
Halifax_HRM_HaliFACT_vNew Logo_	Over the past year, the HalifACT 2050 project team engaged hundreds of internal and external stakeholders and community members across the municipality. The engagement process increased awareness, facilitated discussions about strategies, tools and barriers to action, strengthened existing networks, and built new networks and partnerships to support implementation.		P equity Participation
Halifax_HRM_HaliFACT_vNew Logo_	The project team hosted five stakeholder workshops and more than 35 pop-up sessions, presented to more than 25 groups or organizations and met with three Joint Emergency Management volunteer teams. HalifACT 2050's online presence through Shape Your City saw more than 2,800 visitors, 1,300 survey respondents, and 23,000 votes cast for priority actions. Social media channels were used to raise awareness and spark conversation.		P equity Participation
Halifax_HRM_HaliFACT_vNew Logo_	34 Work purposefully, meaningfully, and collaboratively, with the Mi'kmaq and other groups seeking reconciliation, including African Nova Scotian communities		adaptation action d equity P equity Participation
comox_valley sustainability strategy	Partner with local non-profit organizations to ensure safe environments for cross-cultural and cross-generational learning.		d equity P equity Participation
comox_valley sustainability strategy	Objective 7.3.3: Increase the profile and involvement of Comox Valley First Nations in all planning and decision making processes, as well as in the economy and local cross-cultural events.		adaptation action d equity P equity
comox_valley sustainability strategy	Develop a protocol for discussion, consultation and decision making with local First Nations groups for all local governments, agencies, institutions and larger development projects to use.		adaptation action P equity
saltspring islandcrd__climate-action-strategy__2021	First Nations: The CRD will look to First Nations for leadership in understanding how to create new regional planning and decisionmaking systems together on their Traditional Territories.		adaptation action P equity
cape_bretonMCCAP_Final_Report_adopted_by_Council	It is recommended that CBRM meet regularly with: · other Cape Breton municipal governments; · Cape Breton First Nations communities, · the Eastern District Planning Commission; · relevant provincial government departments such as Transportation and Infrastructure Renewal (NSTIR), Natural Resources, and Environment, and the Municipal Services Division of Service Nova Scotia and Municipal Relations; · Parks Canada; · Nova Scotia Power Inc.; and · Bell Aliant.		adaptation action P equity Participation
toronto-resilience-strategy	And we know that vulnerable residents are much less likely to participate in civic processes or see themselves reflected by government. While Toronto is already making exciting strides towards resilient neighbourhoods and infrastructure, more can be done towards realizing resilience across the city.		Factbase P equity
kitchner_Community-Climate-Adaptation-Plan---Full-ACCESS	While it is not possible to capture every stakeholder perspective in the community, to ensure marginalized voices and needs were included, the Region also retained Sustainable Societies Consulting Group (SSCG) to engage four main groups or populations: (1) social service providers/organizations; (2) people with Part I: Plan development 38 Community Climate Adaptation Plan □ □ □ □ lived experience living on low or fixed income, in precarious housing and/or experiencing homelessness; (3) neighbourhoods; and (4) Indigenous peoples and organizations.		P equity Participation
calgary_climate-strategy-july-2022	1.1 Establish a community climate vulnerability and resilience working group that can provide a diversity of worldviews and perspectives to guide and inform climate adaptation efforts. The proposed membership and scope of this working group are in the process of being refined and will be implemented in 2022 through 2023.		adaptation action P equity Participation
UNCERTAINTY QUOTES			

Clare_Climate_Change_Adaptation_Plan	In furtherance of accepting the challenge and commitment to reduce to the potential impacts of climate change, the Municipality of Clare has prepared this Climate Change Action Plan in an effort to identify priority adaptation impacts and actions for the Municipality. Through adaptation planning, Clare is now in a position to prepare for an uncertain climatic future.	Future climate	uncertainity
Clare_Climate_Change_Adaptation_Plan	Warmer temperatures also directly influence precipitation patterns causing more severe and unpredictable weather patterns. Droughts can threaten livestock and agricultural industries, while severe storms can threaten lives and damage ecosystems.	Future climate	uncertainity
Yarmouth_Climate Change Adaptation	CLIMATE CHANGE ADAPTATION Page | 132 11. Climate Change Adaptation Preamble Climate change could have far-reaching and unpredictable environmental, social and economic consequences. As a result of global warming, glaciers have been melting, sea levels have risen, and climate zones are shifting.	Future climate	uncertainity
st__albert_cap_final	While potentially an important topic for future consideration, this Plan did not investigate the effects of future changes to critical infrastructure and services outside St. Albert's municipal boundaries, or potential changes to St. Albert resulting from overall changes to our social, economic, or political system.	Future climate	uncertainity

Beaver_County_Climate_Resilience_Expr	The impacts of climate change on communities can be numerous and diverse, giving rise to potentially significant, though uncertain consequences, for municipal infrastructure and services, private property, the local economy and environment, and the health and lifestyles of citizens— be it through changing patterns of precipitation with increased risk of flooding and drought, increased strain on water resources, rising average temperatures and more common heatwaves, more frequent wildfires, or more intense ice, snow, hail or wind storms. Climate change may also present opportunities for communities.	Future climate	uncertainity
Beaver_County_Climate_Resilience_Expr	Predicting the future is inherently uncertain. To accommodate this uncertainty, projections of future climate change consider a range of plausible scenarios known as RCPs (Representative Concentration Pathways). Scenarios have long been used by planners and decision-makers to analyse futures in which outcomes are uncertain.	Future climate	uncertainity
Burnaby_Climate Action Framework (2020	This assumption is highly uncertain, but currently is required to achieve carbon neutrality, alongside "additional reductions" which remain to be defined.8 5.0 CLIMATE ACTION FRAMEWORK The Climate Action Framework responds to the climate emergency and the strong and urgent action needed.	Future climate	Factbase uncertainity
Barrington_Municipal Climate Change Ada	If climate change is real, and if in fact the Municipality is truly vulnerable, action today could result in nothing less than preparedness and protection. However, if the Municipality chooses to do nothing, the end result could be crisis and disaster.	Future climate	Factbase uncertainity
BrazeauCounty_Climate_Resilience_Expr	Predicting the future is inherently uncertain. To accommodate this uncertainty, projections of future climate change consider a range of plausible scenarios known as RCPs (Representative Concentration Pathways). Scenarios have long been used by planners and decision-makers to analyse futures in which outcomes are uncertain.	Future climate	uncertainity
Cambridge_climate_adapt_plan_2019082	Successfully preparing our City to adapt to anticipated future changes will require effective implementation of actions defined in this Plan and ongoing monitoring and review of actions to assess their efficacy and to determine if course correction is required. Adaptation planning requires us to make decisions based on an uncertain future, and therefore this Plan is by design intended to be flexible with limited prescriptive guidance.	Policy Impact/I	uncertainity
Abbotsford_RegionalStrategies-FraserVall	A number of farms in the Fraser Valley rely on the Seasonal Agricultural Workers Program for labour.98 However, this program has limited flexibility to accommodate unexpected shifts in labour requirements. Technological solutions (to replace labour) may be more suitable for some production systems as they lessen reliance on labour altogether, but research is needed to identify and evaluate technologies and their relevance and costeffectiveness in the Fraser Valley context.	Future climate	uncertainity
GreaterSudbury_Addendum - June 13, 20	The changing climate presents us with an uncertain future, but by developing this CCCAP, Greater Sudbury will be better prepared and resilient to changes that may come.	Future climate	uncertainity
cityofkamloops_communityclimateactionpl	Ensuring affordable housing options are available as redevelopment and infill projects coupled with population growth may contribute to increasing rent and property prices. Actions to increase rental housing availability and some affordability provisions have been included in the CCAP, but further work will be necessary to determine and mitigate potential impacts on housing affordability.	Policy Impact/I	maladaptation? uncertainity
windsor_Climate Change Adaptation Plan	Action 1.3 Build financial support for unforeseen impacts of climate change ¨ Develop a Municipal severe weather reserve fund to address funding deficits due to emergency response.	Future climate	uncertainity
toronto-resilience-strategy	In addition to this action, all actions in the Resilience Strategy may affect Indigenous communities in both predicted and unexpected ways. The City will work with Indigenous partners (including Indigenous nations, communities and organizations) to identify the impacts on Indigenous peoples and work with Indigenous communities to ensure they benefit from the Strategy and ensure there are opportunities to lead the implementation of the Strategy.	Policy Impact/I	uncertainity